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ONE HUNDRED AND SIX

COPPER PLATES
OF
MECHANICAL MACHINES,
AND
IMPLEMENTS OF HUSBANDRY,
APPROVED AND ADOPTED BY
THE SOCIETY
FOR THE
ENCOURAGEMENT
OF
ARTS, MANUFACTURES, AND COMMERCE,
AND
CONTAINED IN THEIR REPOSITORY,
IN THE ADELPHI BUILDINGS IN THE STRAND.

ILLUSTRATED BY
A particular Deſcription of each Inſtrument, and an Account of the ſeveral Diſcoveries and Improvements in Agriculture, Manufactures, Mechanics, Chemiſtry, and the Polite Arts, which have been promoted and encouraged by the Society, in different parts of this Kingdom, and in the Colonies of America.

CAREFULLY CORRECTED AND REVISED,
By ALEXANDER MABYN BAILEY,
REGISTER TO THE SOCIETY.

VOL. II.

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M.DCC.LXXXII.

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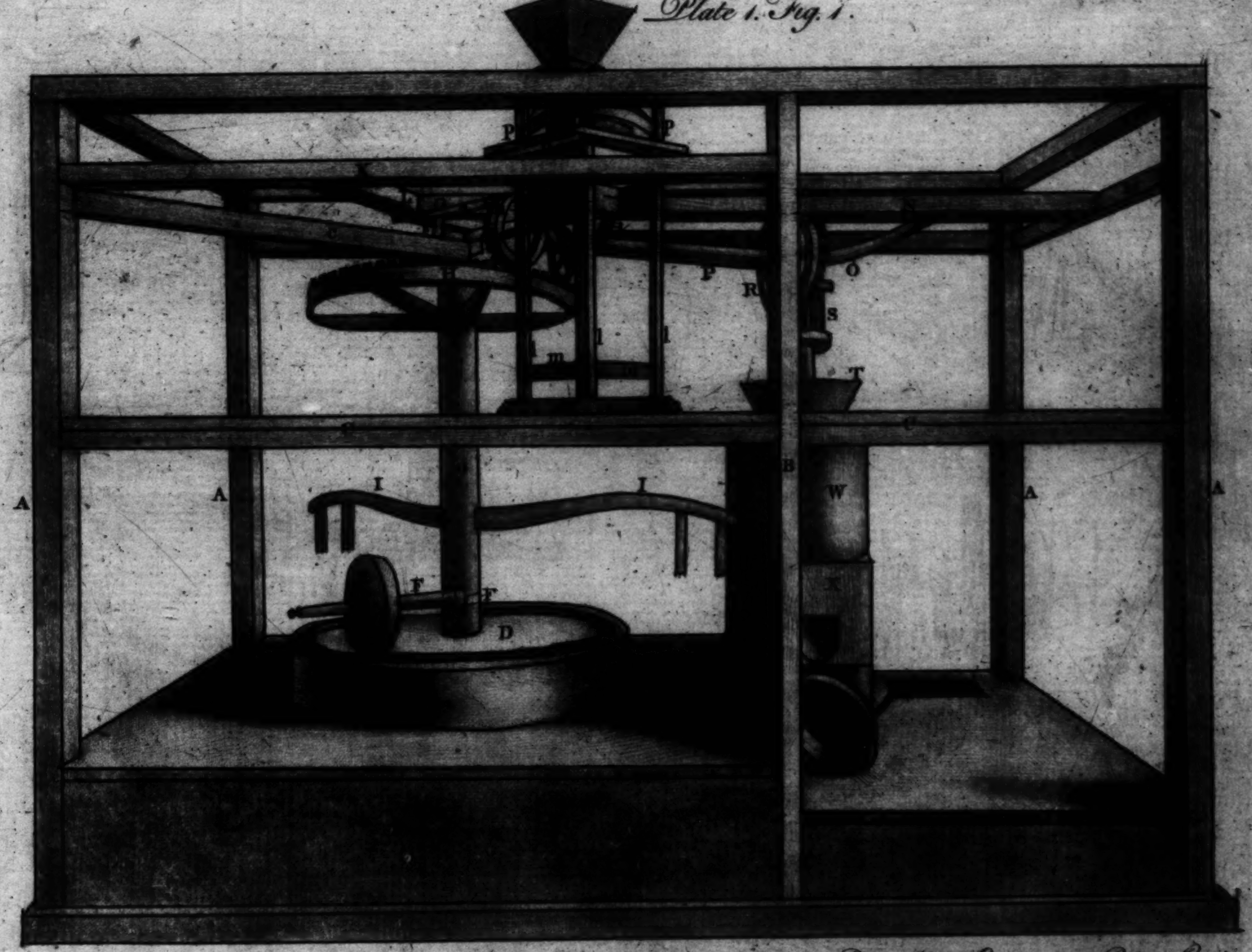
A Perspective View of Mr. Charles Lloyd's Cyder and Malt-mill, to be worked by Horse.

Plate 1. Fig. 1.



The Drawings made by Alexr. Malyn Bailey.

The Plates Engraved by Robert Laurie

BOOK I.

OF AGRICULTURE;

COMPREHENDING

Deſcriptions and Explanations of the ſeveral Ploughs, and Implements of Huſbandry, repreſented in the Copper-plates hereto annexed.

CHAP. I.

A Perſpective View of Mr. Charles Lloyd's CYDER *and* MALT-MILL.

PLATE I. FIG. I.

A, A, A, A, THE four corner Poſts, eighteen feet and ſix inches long, from ſhoulder to ſhoulder of their tenons, and nine inches ſquare: theſe Poſts are framed into the ends of the groundſel and cap-ſill.

B, One of the Poſts that forms a Partition: this Poſt is eighteen feet ſix inches long, ſix inches broad, and four inches and a half thick; framed into the groundſel and cap-ſill nine feet ſeven inches and a half from the end of the Mill.

C, C, The Girders of the ſecond Floor are framed into the Poſts A and B, ten feet and ſix inches high in the clear: theſe Girders are ſix inches broad, and four inches and a half thick.

D, A circular Platform, nine feet and eight inches diameter, and one foot and eight inches deep, having a groove round it, five feet and ſeven inches diameter, a foot broad at the bottom, and one foot and nine inches broad on its upper ſurface.

E, A Stone Roller, four feet diameter; eight inches thick on its edge, and a foot thick at its center; it revolves on its edge, on an axis ten feet and ſix inches long, and ſeven inches diameter; which is connected to the upright Shaft G by an iron Collar F: the Roller is fixed on its Axis, four feet and ſeven inches diſtant from the center of the Shaft G.

F, The Iron Collar, by which the axis of the Stone-Roller is connected to the perpendicular ſhaft G, is three inches broad, and half an inch thick; it is let into a groove in the ſhaft fluſh with its outer ſurface, and the ends of it ſcrewed to the ſides of the axis of the Roller.

G. The main Shaft of the Mill, eleven feet long, one foot two inches and three fourths diameter; turns on an iron ſpindle in the center of the Plat-form D.

H, The Crown-face-wheel, eight feet diameter, with ninety-ſix cogs: this Wheel is fixed to the main ſhaft by ſix arms mortiſed into the ſhaft, two feet and ſix inches below its upper end.

I, I, Two of the curved Arms, by which the main ſhaft G is drawn round by three horſes: theſe Arms are eight feet long from the ſhoulders of their tenons, and five inches ſquare at the ſaid ſhoulders, and are fixed in the ſhaft, three feet and ſeven inches above its upper end: at the outer ends of each of theſe Arms, are two perpendicular Arms, two feet long, three inches broad, and two inches and a half thick, to which the horſes collars are hooked for them to draw by.

K, A Side Rail, nine inches broad, and five inches thick; framed edge-ways into the Poſts A and B, two feet and three inches below the cap-ſill.

L, The Beam, that carries the ſpindles of the main ſhaft, and the horizontal ſhaft: this Beam is eighteen feet three inches long, a foot by eleven inches in the middle; and a foot, by ſix inches, at each end.

M, The End Rail, fifteen feet and nine inches long; nine inches broad, and five inches thick, framed edge-ways into the Poſts A, A, two feet and three inches below the end cap-ſill.

N, A Rail, one end of which is framed into the beam L, and the other end of it in the end rail M: this rail is nineteen feet long, nine inches broad, and five inches thick; ſet edge-ways, and carries the arm or guide of the Malt wheel.

M, The Lever, by which it is diſcharged from the horizontal Crown-face-wheel, and one end of the Carriage-rail of the horizontal ſhaft.

O, The Carriage-wheel of the horizontal Shaft: this Rail is eleven feet and ſeven inches long, eight inches broad, and five inches thick; at the part where the ſpindle of the ſhaft turns, it is eleven inches thick, and is bent a foot out of a horizontal poſition.

P, The horizontal Shaft, eleven feet and nine inches long, and eleven inches diameter, turning on iron pivots, two inches diameter, in braſs collars, in the Beam L and Carriage-rail.

Q, A vertical Crown-wheel, three feet ſix inches and a half diameter, having forty-three coggs, and is fixed on the horizontal ſhaft P with four arms, and acts in the coggs of the wheel H.

R, A vertical Crown-wheel, five feet and ſeven inches diameter, having ſixty-four coggs: this wheel is fixed, on the other end of the horizontal ſhaft, with four arms; and turns the wallower S, on the perpendicular ſhaft of the Mill for grinding the apples.

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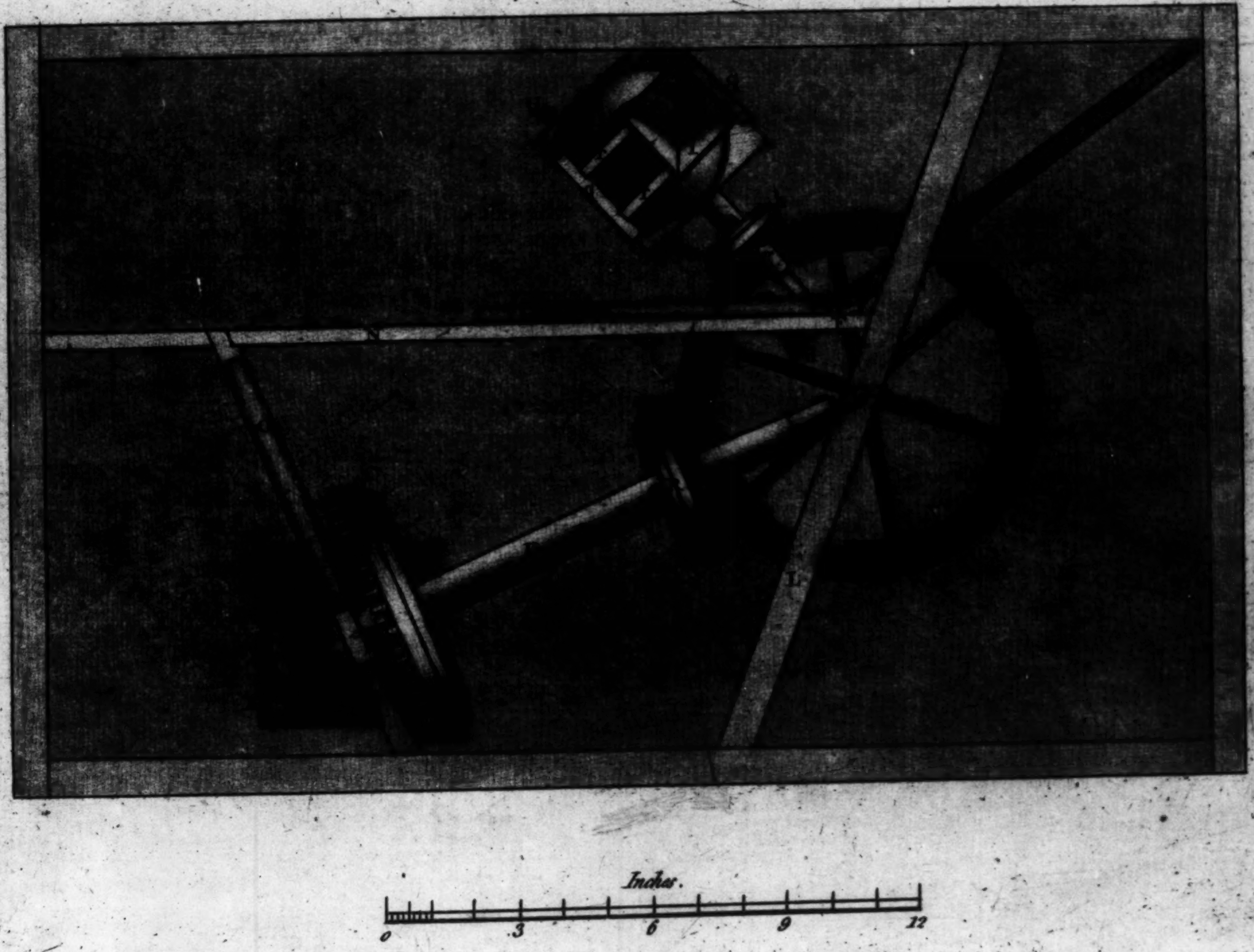
Mr. Lloyds Cyder-Mill
plate 2. Fig. 2.



S, The Wallower, or Trundle-head, two feet long, and one ſoot and ſix inches diameter, having thirteen Trundles.

T, The Hopper of the Cyder-mill, four feet diameter on its upper edge; two feet and eight inches at the bottom, and two feet deep.

U, The Nut of the Mill, in the form of a conic fuſee: this Nut is three feet and two inches long; two feet and ſeven inches diameter at its under end; and one foot diameter at its upper end, its outer ſurface being cut into ſpiral teeth from the top to the bottom.

W, The Shell, or Caſe in which the Nut revolves: this Shell is three feet long, and three feet and nine inches diameter; its inner ſurface made fit to the ſhape of the nut U, and has teeth in a ſpiral direction, juſt the reverſe way as the nut: it is cut through the middle, lengthways; and one part connected to the other with hinges, and is made faſt together with a Bolt and Hook, that it may eaſily be cleared of the pulp, in caſe of its choking.

X, The Block, or Conveyance on which the Shell is fixed: this Block is five feet and ſeven inches high, five feet and three inches broad, and four feet thick; having an aperture on its upper ſurface two feet and ten inches diameter, gradually diminiſhing to the middle of the fore-ſide Y, where it is one foot and ſix inches deep, and one foot and ſix inches broad at the upper edge of its orifice, its under edge being circular, where the Cyder and Pulp are delivered into the oval ſtrainer Z.

Y, The Aperture in the fore-ſide of the Block X.

Z, The Tray, or oval Tub, ſeven feet and nine inches long; its extreme breadth three feet and nine inches, and eleven deep: this Tray has a ſieve or ſtrainer over its inner ſurface, three inches above its bottom; and a leaden pipe in the ſide of it, to convey the Cyder from the Tray into the reſervoir.

a, The Tub, or Reſervoir that receives the Cyder from the Tray, through the leaden pipe: this Reſervoir is two feet and eight inches diameter, and one foot and eight inches deep.

b, The Croſs Rail, that carries the under ſpindle of the nut U: this Rail is five feet long, nine inches broad, and ſeven inches thick at the center of the Block X: its upper edge being bevelled away to two inches thick, except in the center, and its two bearings in the aforeſaid Block. See Plate III.

c, The Carriage-rail of the Malt-mill: this Rail is twelve feet long, nine inches broad, and five inches thick, one end of it is let into a mortiſe, in the Poſt A, and turns on an iron bolt: the other end of it turns looſely in a mortiſe, in the arm or guide d, of the Carriage-rail; the ſpindle of the horizontal ſhaft of the Malt-mill acts in this Rail, ſix inches from the Guide d.

d, The Arm, or Guide of the Carriage-rail C: this Arm is two feet and eight inches long, eight inches broad, and five inches thick; having a mortiſe in its under end, one foot and two inches long, and three inches broad, through which the fore-end of the Rail c riſes or falls, to lift the teeth of the wheel out of its work, as need requires. See PLATE II, Fig. 2.

e, The Lever, by which the fore end of the Carriage-rail c, of the Malt-mill, is lifted out of the teeth of the Crown-face-wheel H: this lever is eight feet ſix inches long, four inches broad, and three inches thick; the back end of of it is rounded off taper to form a handle: it is faſtened againſt the ſide of the Rail N with a ſtrong ſcrew Bolt, on which it turns.

f, The Lifting-rod, by which the Lever e is connected to the Rail c: this Rod is mortiſed through the fore end of the Lever e, one foot four inches and a half from the bolt or axis on which it turns: the lower end of the Rod paſſes through a mortiſe in the fore end of the Carriage-rail, one foot and two inches behind the Guide-arm d, and is faſtened to the Lever and Rail with iron bolts.

g, The horizontal Shaft of the Malt-mill: this Shaft is five feet and five inches long, and ten inches diameter, where the Crown-wheel K is fixed on it: it turns on two iron ſpindles.

h, A vertical Crown-wheel, fixed on the horizontal Shaft g, one foot and eight inches from the inner end: this Wheel is two feet diameter, and has twenty-three coggs, and is turned by the Wheel H, as before mentioned.

i, A vertical Crown-wheel, two feet and three inches diameter, having thirty-ſix coggs: this Wheel is fixed on the outer end of the Shaft g, and gives motion to a Wallower, eight inches and a half diameter, with ten Trundles, and the Mill-ſtone fixed on an iron ſhaft.

k, The Mill-ſtones, two feet eight inches diameter. See Plate II.

l, l, l, l, The Hurſt-poſts, five feet and nine inches long, ſix inches broad, and five inches thick: theſe Poſts are mortiſed into two groundſels, four feet and two inches long, four broad and three thick. Note, the ſills are fixed to the floor with ſcrew bolts.

m, m, m, m, The four under Rails, framed into the Hurſt-poſts: theſe Rails are five inches broad, and four inches thick.

n, n, The Bray-trees, framed into the Hurſt-poſts four feet and eight inches above the groundſels: they are a foot broad, and four inches thick.

o, o, o, o, The top Rails of the Hurſt, framed into the Poſts edgeways: they are ſix inches broad, and five inches thick, on which the Hurſt-plank is fixed.

p, p, p, p, Four Poſts, one foot and ſix inches long, and three inches ſquare: theſe Poſts are mortiſed into the Hurſt-plank, to ſupport the ladder of the Hopper.

q, q, Two Rails, two feet and ſix inches long, five inches and a half broad, and three inches thick, mortiſed on the upper ends of the Poſts p, p, p, p.

r, The Frame, or Ladder that ſupports the Hopper: this Frame conſiſts of two ſide-rails, bearing on the Rails q q, three inches ſquare, and two croſs-rails, three inches ſquare.

s, The Hopper, two feet ſquare at its upper ſurface, four inches ſquare at the bottom, and a foot deep.

t, The Bridge-tree, two feet and three inches long, excluſive of its tenons: this Bridge-tree is four inches ſquare; its tenons paſſing through a mortiſe in each of the Bray-trees n, n, at their centers, reſting when in a horizontal poſition on a Croſs-rail of the ſame dimenſions: the under ſpindle of the perpendicular ſhaft reſts on the middle and upper ſurface of this Bridge-tree: the Tenor, or Tong, that paſſes through the looſe mortiſe of the inner Bray-tree, and is fixed in

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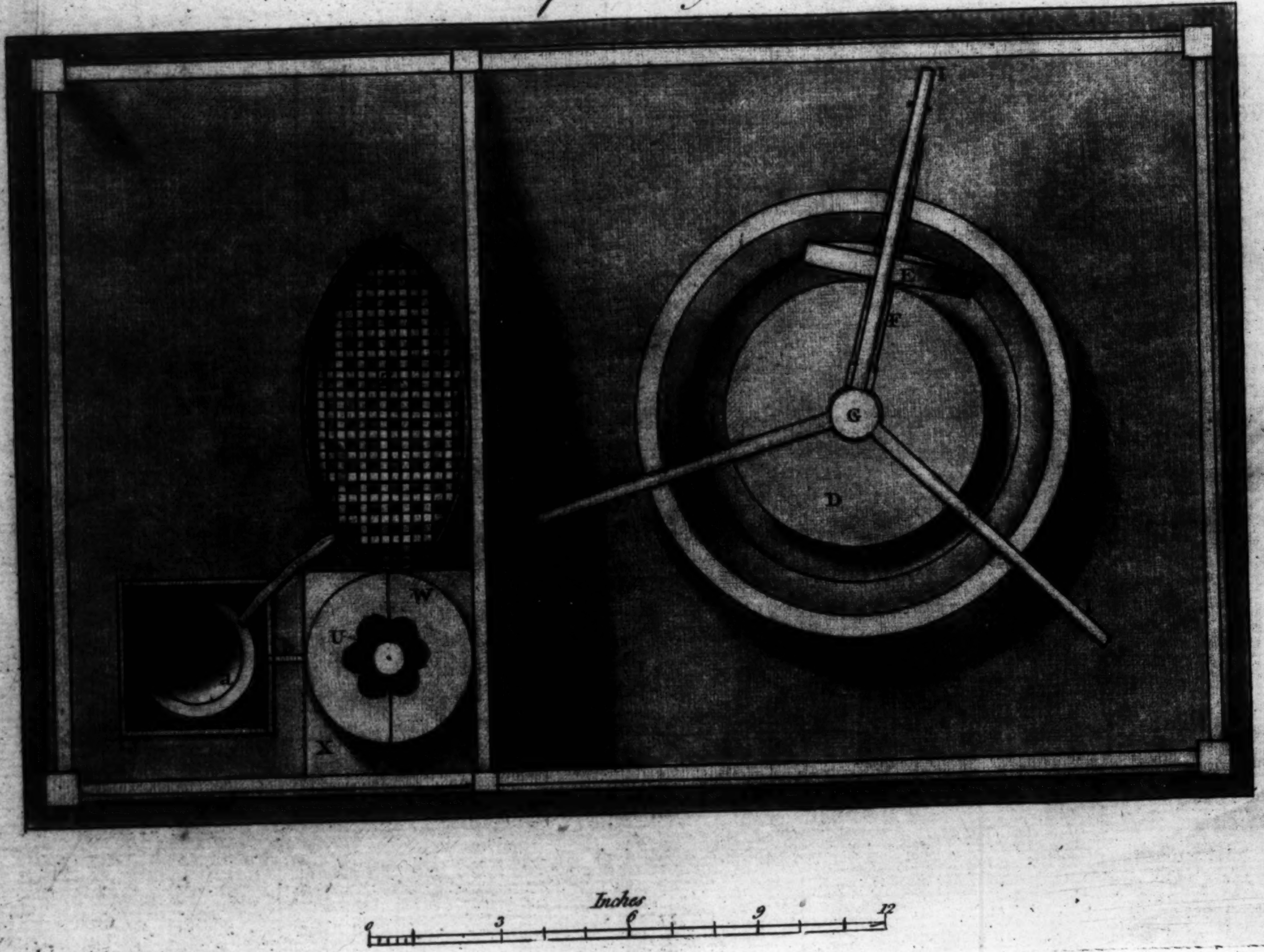
Mr. Lloyds Cyder-mill.
plate 3. Fig 3.



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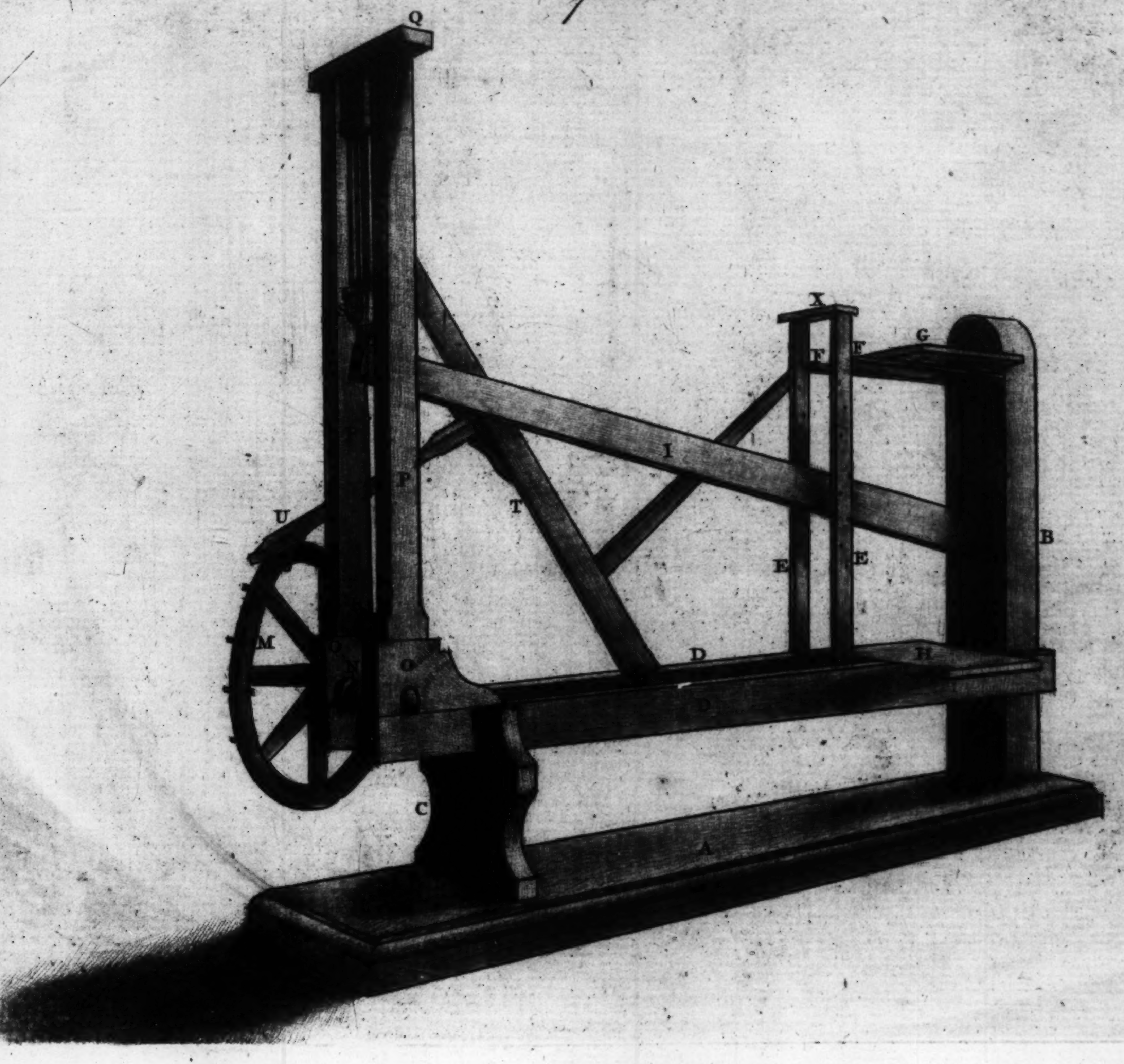
Chap 1.
A Perspective View of Mr Lloyds Cyder-preſs.
plate 1.



in a lever on the inner ſide of the Mill-frame; the outer end of which turns on a center-bolt in the upper end of one of the Hurſt-poſts.

u, The upper Lever, by which the under Lever and inner end of the Bridge-tree are lifted, to raiſe or depreſs the Mill-ſtone: this Lever is four feet and ſix inches long, three inches broad, and two inches thick; its fore end forming a Handle, whereby it is actuated, having an iron Rod, ten inches long, two inches broad, and three eighths of an inch thick, paſſing through a mortiſe in its back end, the under end of which turns on a Bolt in the under Lever.

CHAP. II.

A Deſcription of Mr. LLOYD's CYDER-PRESS.

PLATE I.

A Perſpective View of the PRESS.

A, THE Bed, or groundſel of the Preſs: this ſill is eleven feet and three inches long, two feet and ten inches broad, and ſix inches thick.

B, The end Poſt of the Preſs: this Poſt is ten feet and two inches long, excluſive of its tenon; one foot broad, and eight inches thick: it is mortiſed into the end of the groundſel, having its upper end rounded off, and a mortiſe through it, two feet long, and three inches broad; the under end of the mortiſe is two feet and three inches above the upper ſurface of the groundſel.

C, The Bolſter of the ſide-rails: this Bolſter is two feet and ſix inches long, one foot and three inches broad, and three inches and one fourth thick: it is fixed on the groundſel one foot and ten inches from its fore end, with ſtrong ſcrews.

D, D, The Side Rails: theſe Rails are ten feet and nine inches long; ſix inches ſquare at their back ends, where they are let into the Poſt B; and five inches ſquare at their fore ends.

E, E, Two Styles, three feet and four inches long, three inches broad, and two inches thick: theſe Styles are erected on the Side-rails, three feet and ſix inches diſtant from the Poſt B, and fluſh with their inner edges, having eight holes through them, to admit an iron Bolt to ſupport the back end of the Beam, while the apples are putting on the Preſs.

F, F, Two Rails, that form a Frame with the Styles and Poſts, on which the Preſs-boards are laid when they are not in uſe.

G, One of the Preſs-boards, on which the pulp of the apple is laid in horſe-hair bags, or between layers of ſtraw: theſe Preſs-boards are one foot and nine inches long, one foot and ſix inches broad, and an inch and a half thick.

H, The Bed of the Preſs: this Bed is two feet and five inches long, one foot and eleven inches broad, and three inches thick, having a Groove or Channel round it, to receive and convey off the Cyder as it is preſſed from the pulp.

I, The Lever, by which the Cyder is preſſed from the pulp: this Lever is ten feet and ſix inches long, ſix inches and a half broad, and four inches and a half thick at its back end, and four inches and a half by three inches at the fore end: the back end of the Lever forms a Tenon, one foot long, and three inches thick, and paſſes through the mortiſe in the Poſt B.

K, The Mortiſe, through the back end of which the Lever paſſes, and alſo a wedge to preſs down the end of the Lever on the pulp of the apples.

L, A Wedge, driven through the Mortiſe in the Poſt B. See PLATE II.

M, A Spoke-wheel, two feet diameter: its fellies are two inches broad, and an inch and a half thick, having eight ſpokes and twelve pins: the uſe of the pins is to prevent the Wheel from running back, when the fore end of the Beam I is lifted up as high as is found neceſſary.

N, The Roller, or Barrel on which the line of the Blocks is wound, to raiſe the end of the Beam: its length from ſhoulder to ſhoulder of its Spindles is eight inches, and its diameter four inches and a half; the Spindle, on which the Wheel M is fixed, is nine inches long, and three inches and a half diameter; the other Spindle is five inches long, and three inches diameter.

O, O, Two Brackets, one foot and nine inches long each; ſix inches broad, and three inches and a half thick, fixed edge-ways, on the fore ends of the Side-rails D, D, with ſtrong ſcrews: the Spindle of the Roller N turns in a Collar in theſe Brackets.

P, P, Two Columns, four feet three inches and a half long; ſix inches diameter at their under ends, and four at their upper ends.

Q, The Cap-ſill, or Top-rail, to which the Block is fixed: this Cap-ſill is one foot and ſix inches long, four inches broad, and two inches thick, mortiſed on the upper ends of the Columns P, P.

R, A Guide-roller, eight inches long, and four inches diameter, having two iron Gudgeons, which turn in the upper edges of the Brackets O, O: this Roller guides the Block-line from rubbing againſt the end of the Lever I.

S, S, A pair of Blocks, containing five Pulleys, three inches diameter: the upper Block is fixed with ſcrews to the under ſide of the Cap-ſill Q: the under Block, when the line is furled through it, and the upper Block is hooked to the ſtaples in the upper or under edge, and fore end of the Beam, as need requires.

T, A Brace, five feet ſeven inches and a half long, four inches broad, and two inches thick: the under end of the Brace is mortiſed into this back Side-rail; its upper end into the back Column, one inch below its upper end.

U, A Lever, three feet long, and two inches ſquare at the back end, acting on a center-pin, and a Bracket fixed againſt the Brace T: the middle and fore point of it is rounded off to an inch and an half diameter: near the fore end it is two inches ſquare, through which is fixed a piece of ſaſh-line, which forms two loops, which are put over the pins in the Spoke-wheel M, to prevent it from turning back, when the Lever I is lifted up.

W, A Brace, three feet and eleven inches long, four inches broad, and two inches

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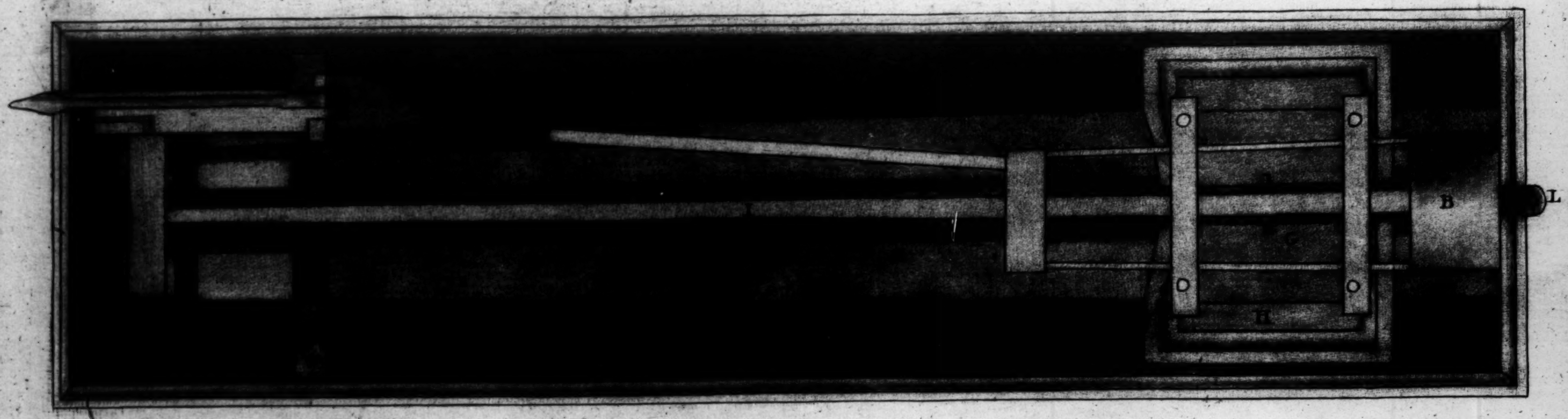
Plate. 2.
Plan of Mr. Loyds Cyder-preſs.



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A Perspective View of Mr. Thomas Orms Field Gate.

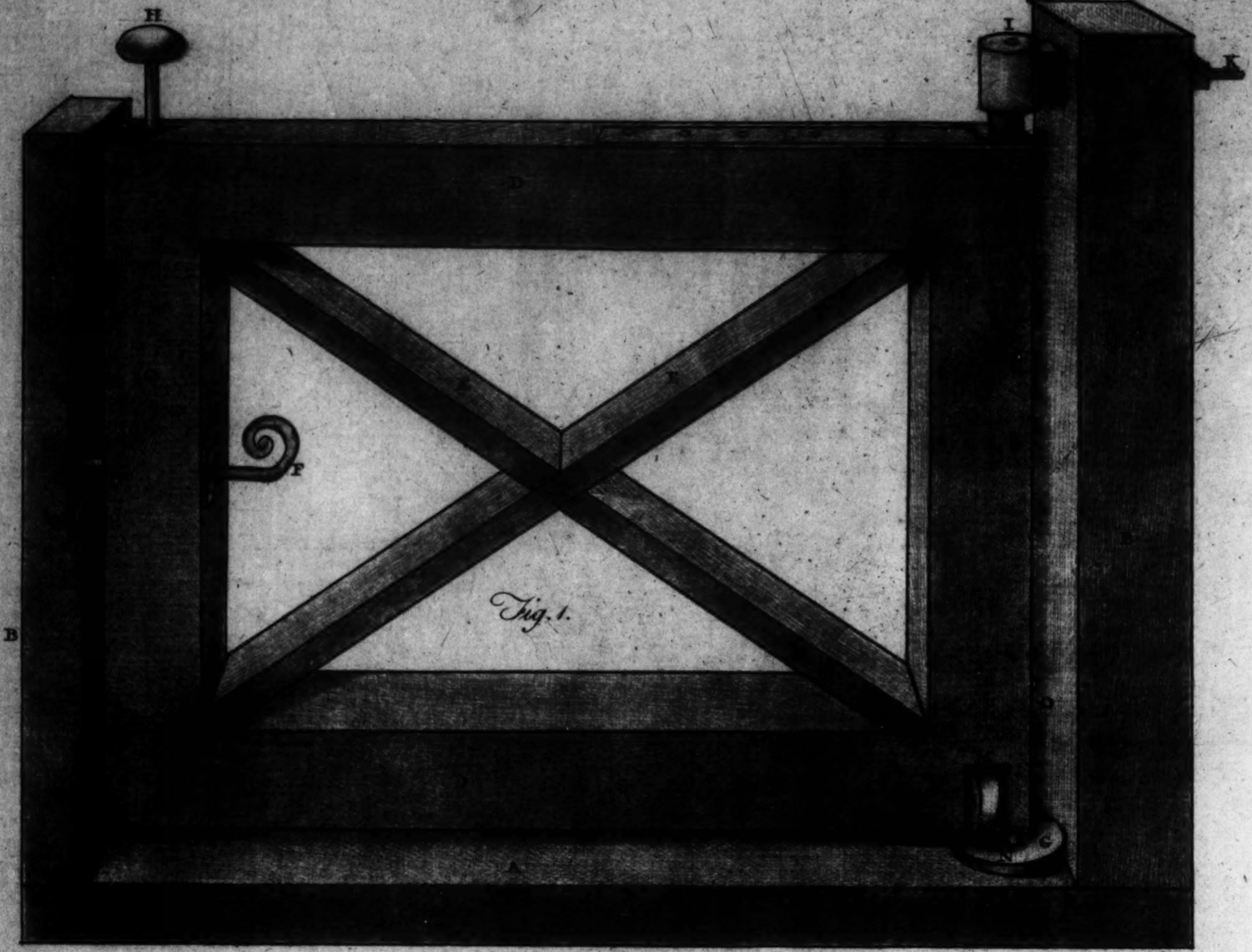
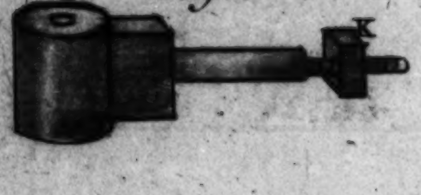


Fig. 1.

Fig. 2.



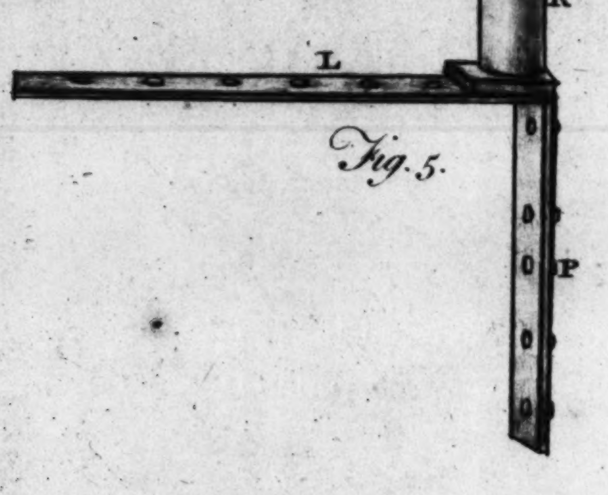


Fig. 5.

Fig. 4.

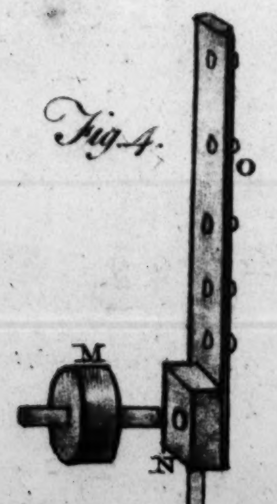
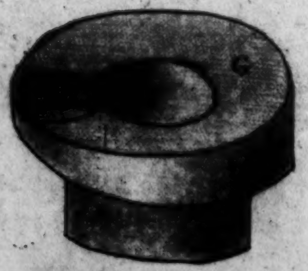


Fig. 3.



inches thick: the lower end of this Brace is tenoned into the Brace T; its upper end into the Style E, eleven inches below its Top-rail X.

X, The Top-rail of the Styles E, E: this Rail is eleven inches long, four inches broad, and two thick.

Theſe Models were examined by the Committee of Mechanics, who recommended to the Society to purchaſe the Models, at an expence not exceeding Twenty-one pounds, to which the Society agreed, March 25, 1761.

C H A P. III.

A Deſcription of Mr. THOMAS ORME'S FIELD-GATE.

FIG. 1.

A, THE Groundſel, two feet three inches and three eighths long; three inches and one eighth broad, and one inch and three eighths thick: this Sill is mortiſed into the ſide Poſts B, B, and let into the ground, even with its upper ſurface.

B, B, The two Side-poſts, elevated two feet and nine inches above the upper ſurface of the Sill, and ſunk into the ground a depth ſufficient to keep them ſteady: the inner, or hanging Poſt, is three inches and one eighth broad, and one inch and three fourths thick: the Latch-poſt is two inches and one fourth broad, and one inch and a half thick.

C, C, The Rails of the Gate; are one foot eleven inches and three eighths long, excluſive of their tenons; two inches and a half broad, and one inch and three eighths thick.

D, D, The Styles of the Gate; are two feet ſix inches and a half long, two inches and a half broad, and one inch and three eighths thick.

E, E, The Croſs-Braces; one foot and ten inches long, one inch and three eighths broad, and three fourths of an inch thick.

F, An iron Latch, with a ſpiral handle, which paſſes through an aperture in the fore Style, and turns on an iron Pin, in the fore edge of the Style, projecting one inch, and one fourth therefrom, and falls into the Notch, or Catch Q, in the ſide of the Poſt.

G, A Braſs, or Belmetal ſpiral Nut, whoſe under part is a Collet, let into the groundſel, till its ſhoulder bears on its upper ſurface; the under end of the Collet, paſſing through the Sill, is wedged or rivetted to its under ſurface: this Nut is two inches and a half diameter, three fourths of an inch thick at its back edge, and one eighth of an inch at its fore edge, where there is a ſmall notch for the Friction-wheel M to fall into when the Gate is latched, and in a ſtate of reſt: but, as ſoon as it opens, it obtains a pendulous motion, by the Friction-wheel paſſing alternately over the inclined plane, on each ſide of the Notch, on the ſurface of the Nut. See Fig. 1. and 3.

H, An iron Rod, eight inches and one fourth long: its upper end is covered with a ſpherical Cap of Iron to put the Hand on, when the Gate is to be opened; its under end bearing on the Latch a little behind its center-pin.

I, A round iron Socket, one inch and three eighths diameter, and one inch and a half long, with a ſmall hole in its upper ſurface, to pour in oil; and in its under ſurface there is a hole, properly fitted, to receive the Gudgeon R: this Socket has a Shank, projecting from its inner ſide, two inches and a half long: the head of this Shank is two inches and a half broad, and five eighths of an inch thick: The tail end of the Shank is five eighths of an inch ſquare, and is driven through the Poſt, and is faſtened thereto with the Screw and Nut K. See Fig. 1. and 2.

K, The Shank of the Socket, with its Screw and Nut.

L, A flat iron Clamp, whoſe horizontal Arm is eleven inches long, one inch broad, and three ſixteenths thick: its perpendicular Arms are five inches and a half long, and the ſame breadth and thickneſs as the other: theſe Arms are ſet at right angles to each other, and are let in even with the Rail C, and Style D, and are faſtened thereto with ſtrong wooden Screws. See Fig. 1, and 5.

M, An iron Friction Roller, two inches diameter, and half an inch thick: one end of its horizontal axis turns in a ſquare piece of iron, welded to the perpendicular Plate O, and the other end of it turns in a plate of iron faſtened to the under Rail C. See M, and N, Fig. 1, and 3.

N, A piece of Iron, an inch and a half long, an inch broad, and three fourths of an inch thick, with a hole in the middle of it, for the axis of the Friction-roller M, to turn in: it has alſo a Spindle, or Gudgeon at the bottom of it, properly fitted to the hole in the ſpiral Nut and Collet G: this piece is welded to the Clamp O, as before-mentioned.

O, An iron Clamp, ten inches and a half long, an inch broad, and three ſixteenths of an inch thick; to which the piece of iron N, is welded, as above.

P, The perpendicular Arm of the upper Clamp; five inches and a half long, an inch broad, and three ſixteenths thick. See Fig. 1, and 5.

Q, An iron Catch, faſtened to a notch cut in the outer Gate-poſt.

R, A Spindle, or Gudgeon; an inch and one fourth long, and three fourths diameter; its under end having a ſquare foot, which is welded to the Clamp L, and acts in the Socket I. See Fig. 1.

F I G. 2.

I, The Socket.

K, The Screw and Nut, with which the Socket is fixed to the Hanging-poſt.

F I G. 3.

G, The Spiral Nut and Collet.

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Mr. Winne Baker's Scarrificator.

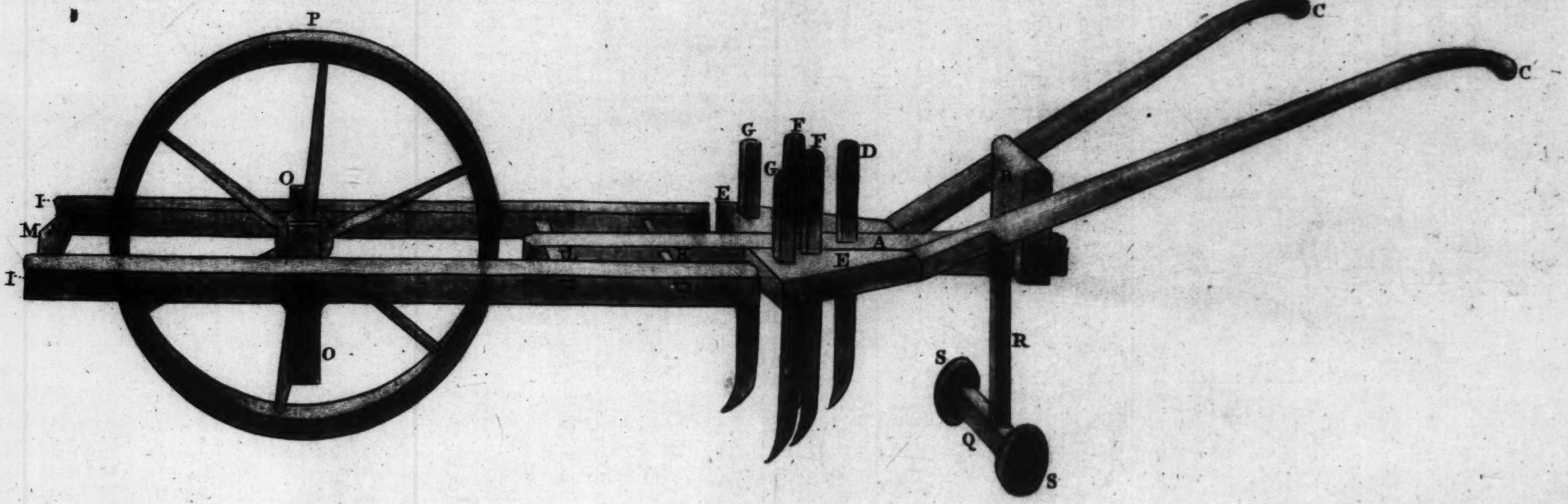

FIG. 4.

M, The Friction-roller, with its Axis.

N, The piece of Iron, in which the Axis of the Friction-roller turns.

O, The Clamp, to which the piece of Iron and its Spindle N are welded.

FIG. 5.

L, The horizontal Arm of the upper Clamp.

P, The perpendicular Arm of the upper Clamp.

R, The Spindle, with its ſquare foot, welded on the upper Arm of the Clamp.

This Field-gate was referred to the Committee of Agriculture, who reſolved that it was deſerving a Bounty of ten Pounds. To which Reſolution the Society agreed, *April* 3, 1766.

CHAP. IV.

A Perſpective View of Mr. WINN BAKER'S SCARIFICATOR.

A, THE Beam, whoſe extreme length is four feet and ten inches, its breadth three inches, and two inches and five eighths thick.

B, A Bolſter, or Brace, ten inches and a half long, ſix inches and a half broad, and two inches and a half thick; faſtened to the Beam (three inches and a half from its back end) with two Cheeks, and a Trundle that is driven through the Cheeks and the Beam.

C, C, The two Handles, four feet long, two inches broad, and an inch and a half thick at their under ends: they are faſtened to the ſides of the Beam, eleven inches diſtant from its back end; and to the Bolſter with wooden Trundles: there are alſo two Trundles, an inch diameter, inſerted into the Handles behind the Bolſter.

D, The hind Coulter, two feet and three inches long, two inches and a half broad in the Blade, an inch and one fourth broad in the Shank, and five eighths of an inch thick in the Shank: this Coulter is mortiſed into the Beam one foot and one inch from its back end.

E, E, Two Cheeks, or Wings, two feet and five inches long, five inches and three fourths broad at their fore ends, an inch and a half at their back ends, and three inches thick: they are faſtened to the ſides of the Beam with two ſtrong iron bolts, ſcrews, and nuts.

F, F, Two Coulters; the ſame ſize as the Coulter D, inſerted into the Cheeks E, E, two feet from the back end of the Beam, and two inches from the ſides of the Beam to the inſide of the ſhanks of the Coulters.

G, G, Two Coulters, of the ſame dimenſions as the former, inſerted into the fore ends of the Wings, or Cheeks, two feet ten inches and a half diſtant from the back end of the Beam, and four inches and a half from the ſides of it to the inſides of the ſhanks of the Coulters.

H, H, The iron Bolts, with which the Cheeks are fixed to the ſides of the Beam.

I, I, The two ſide Rails, four feet ten inches and a half long, two inches and three fourths broad, and two inches thick.

K, The hind Tong, or Tenon, one foot two inches and a half long, two inches and three fourths broad, and an inch thick; inſerted into the ſide Rails three inches and a half from their back ends, and through the Beam thirteen inches and a half from its fore end.

L, A Tong, or Tenon, one foot two inches and a half long, two inches and three fourths broad, and an inch thick, inſerted through the ſide Rails; and the Beam ſix inches and three fourths diſtant from the Tong K.

M, The fore Tong, or Tug-rail, by which the inſtrument is drawn: this Tong is one foot two inches and a half long; its extreme breadth three inches and a half; the breadth at its end two inches and a half, and an inch thick, inſerted into the ſide Rails two inches and a half behind their fore ends.

N, A hole in the middle of the fore Tong, two inches from its fore edge, to receive the iron hook, by which it is drawn.

O, O, Two dove-tail Sliders, one foot long, three inches broad, and an inch thick, inſerted into the inſide of the ſide Rails, one foot and eight inches from their fore ends: the inner ſides of the ſliders are covered with plate-iron, to receive the pivots of the Axis-wheel P, by which the Wheel is raiſed or depreſſed, according to the depth to be ſcarified.

P, The fore Wheel, two feet and ſix inches diameter, and two inches and one fourth on the circumference.

Q, The hind Axle-tree, eleven inches and a half long from ſhoulder to ſhoulder, and two inches and three fourths ſquare.

R, The Poſt, on which the back end of the Scarificator is ſupported, is ſeven inches long from ſhoulder to ſhoulder, and two inches and three fourths ſquare.

S, S, The two hind Wheels are nine inches and a half diameter, and two inches on the rim of the wheel.

This inſtrument was preſented to the Society by Mr. *John-Winn Baker*, *April* 8, 1767.

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Vol. II.
VIII.

P. 11.

Mr. Peters Plough with a Circular Coulter.

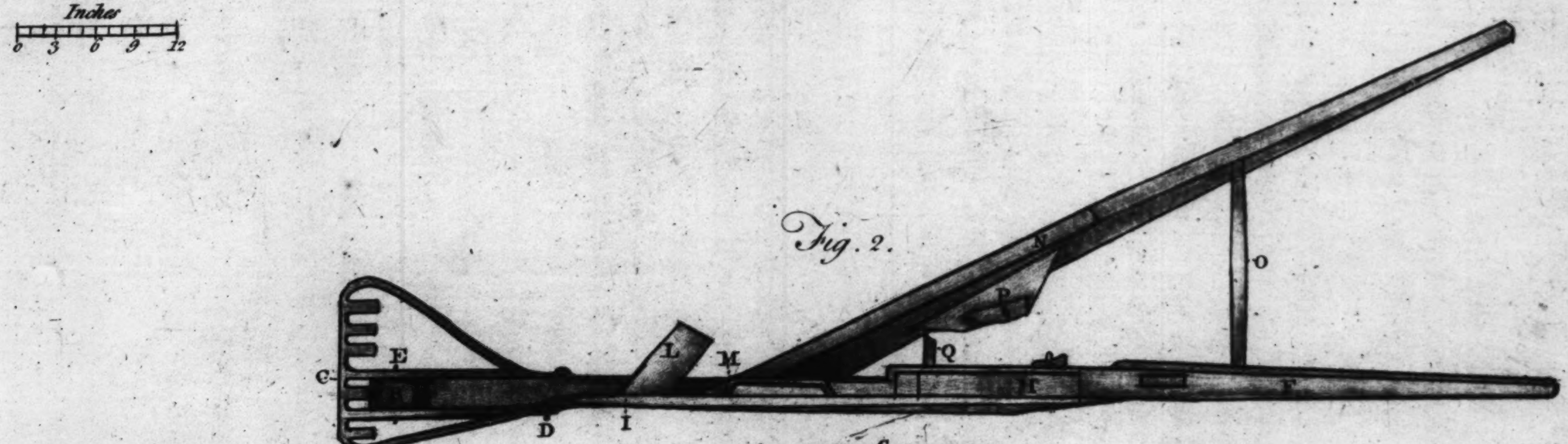

Fig. 2.

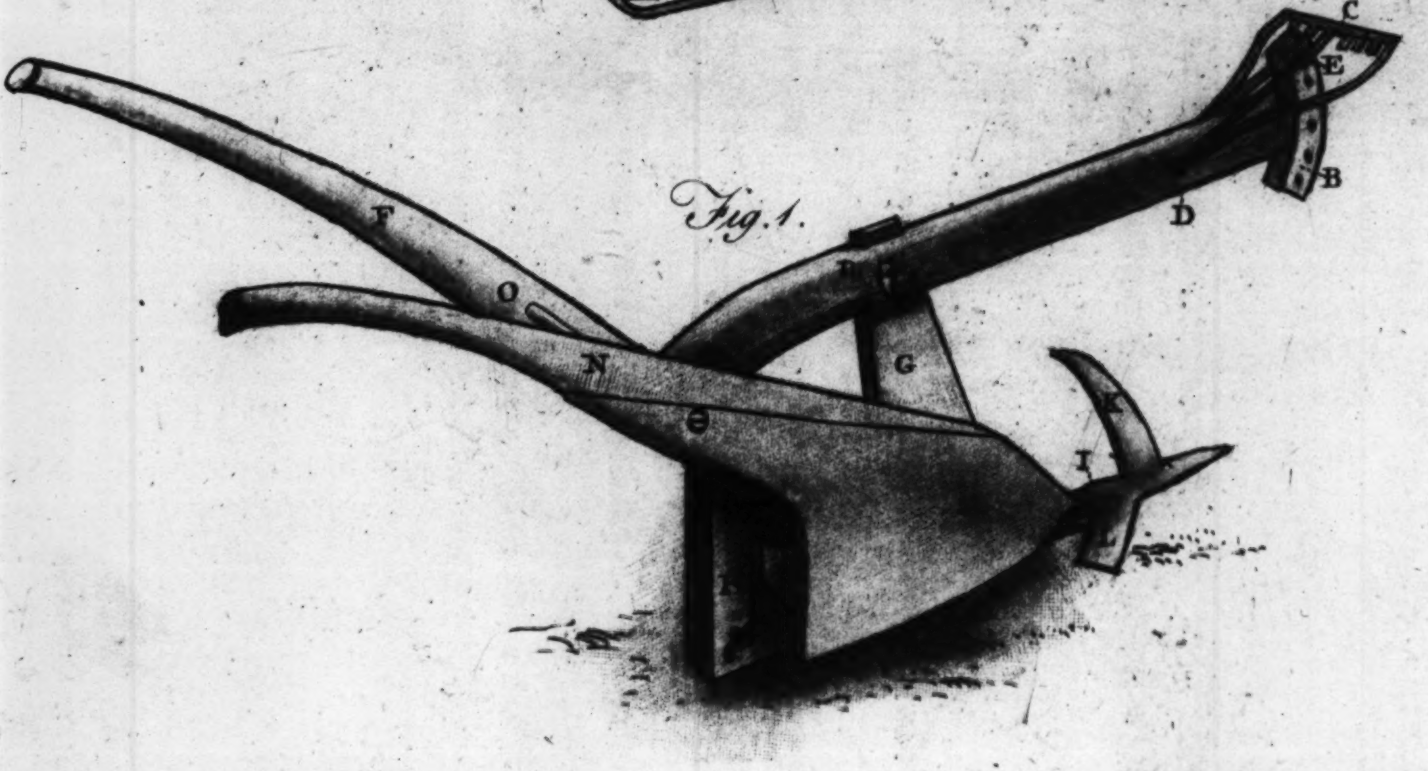

Fig. 1.

CHAP. V.

Deſcription of Mr. PETERS's PLOUGH, *with a circular* COULTER.

FIG. I.

A Perſpective View of the PLOUGH.

A, THE Beam, four feet nine inches long from the four part of the Cat-head to the ſhoulder of its tenons, four inches broad at the back end, three inches at the Cat-head, and three inches thick.

B, The Cat-head, whoſe radius is one foot and two inches, and its portion of a circle eleven inches; in the ſide of the Cat-head are five holes, for raiſing or depreſſing the Bridle, as need requires.

C, The Bridle, or Tug-frame, one foot four inches and a half long from its center-bolt, by which it is faſtened to the Beam: its breadth is one foot and one inch and ſeven eighths of an inch thick: the fore part of this Frame is divided into eight notches, by which the Plough is drawn more to or from land at diſcretion.

D, The Sheat, faſtened to the Beam with a ſtrong tenon, one foot four inches and a quarter diſtant from the left handle; its length is one foot three inches from the bottom of the ground-reſt to the ſhoulder of its tenon, ten inches broad at the bottom, and four inches at the ſhoulder of its tenon, and one inch and a quarter thick.

E, The left Handle, five feet and one inch long, three inches broad at the bottom, two inches and a half thick where the Beam is tenoned into it, and from thence to its upper end it gradually diminiſhes to one inch and a quarter diameter: this Handle (from the Ground-reſt to the upper edge of the Beam) forms an angle with the horizon of thirty-ſeven degrees, and from the Beam to the back end it makes a ſmall curve, to make it come convenient to the hand.

F, F, Two angular pieces of wood fixed, one to the Handle and to the Sheat, the other to the Handle and to the Ground-reſt, to ſtrengthen the Plough, and prevent the earth from falling into the trench from the land-ſide.

Note, only one of the angular pieces is ſeen in this view.

G, The Ground-reſt, three feet four inches and a half long, one inch and a half broad, and three quarters of an inch thick; the fore end of it is pointed with ſteel, four inches in length, at which diſtance is welded a ſteel curved Coulter.

H, The Share, or Fin, welded to the ſide of the Ground-reſt, five inches and a half diſtant from its fore point; the length of the Fin from 1 to 2 is ſeven inches, its breadth from 1 to 3 three inches and a half, and the diſtance from 3 to 4 is four inches and a half.

I, The curved Coulter, ten inches and a half long, two inches and a half broad at the bottom, and three eighths of an inch thick on its back edge.

K, K, The right Handle and Mould-board, ſix feet long from K to K, one foot broad from L to L, and an inch thick.

M, A Plate of Iron, ſeven inches broad, faſtened on the fore ſide of the Mould-board: it is doubled over its fore edge, and nailed to the back ſide of the Sheat.

N, N, Two Trundles, an inch and a quarter diameter, inſerted through the two Handles, to brace them properly together.

O, An iron Staple, welded to the ſide of the Ground-reſt, thirteen inches diſtant from its point, or fore end, and forms a mortiſe for the under end of the Sheat.

F I G. 2.

A Geometrical Plan of the PLOUGH, *turned upſide down, to ſhew the Ground-reſt, the Staple, and Foot of the left Handle,* &c.

A,	The Beam. See Fig. 1.
B,	The Cat-head.
C,	The Bridle, or Tug-frame.
D.	The bottom of the Sheat, fixed in the Staple O.
E, E,	The left Handle.
F, F,	Two angular pieces, whoſe uſe is deſcribed, Fig. 1.
G.	The Ground-reſt.
H.	The Share, or Fin.
K.	The right Handle and Mould-board.
N, N,	The Trundles.
O,	The Staple.

This Plough was tried at Mr. *Fordyce*'s Farm, near *Roehampton*, and on a piece of Common full of fern and furze-roots, &c. of a moderate ſize.

The Committee were of opinion that this Plough performed its work on the Common in a complete manner, and, from the particular conſtruction of the Culter, it is not liable to be choked with the roots, as Ploughs made in the common manner are.

The Committee therefore recommended to the Society to give Mr. *Peters* the ſilver Medal for his ingenious introduction of a circular Coulter, for the purpoſe of avoiding obſtructions in ſtubble, or rough ground, to which the Society agreed, *May* 6, 1772.

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A Perspective View and Plan of Mr. Brands Iron plough.

Fig. 2d.

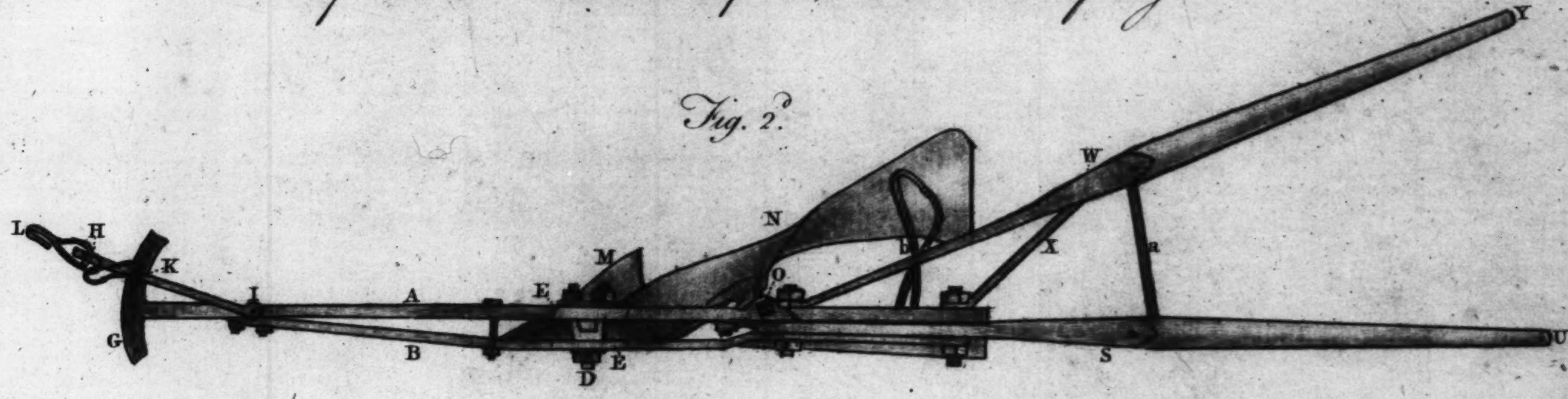

Fig. 1st.

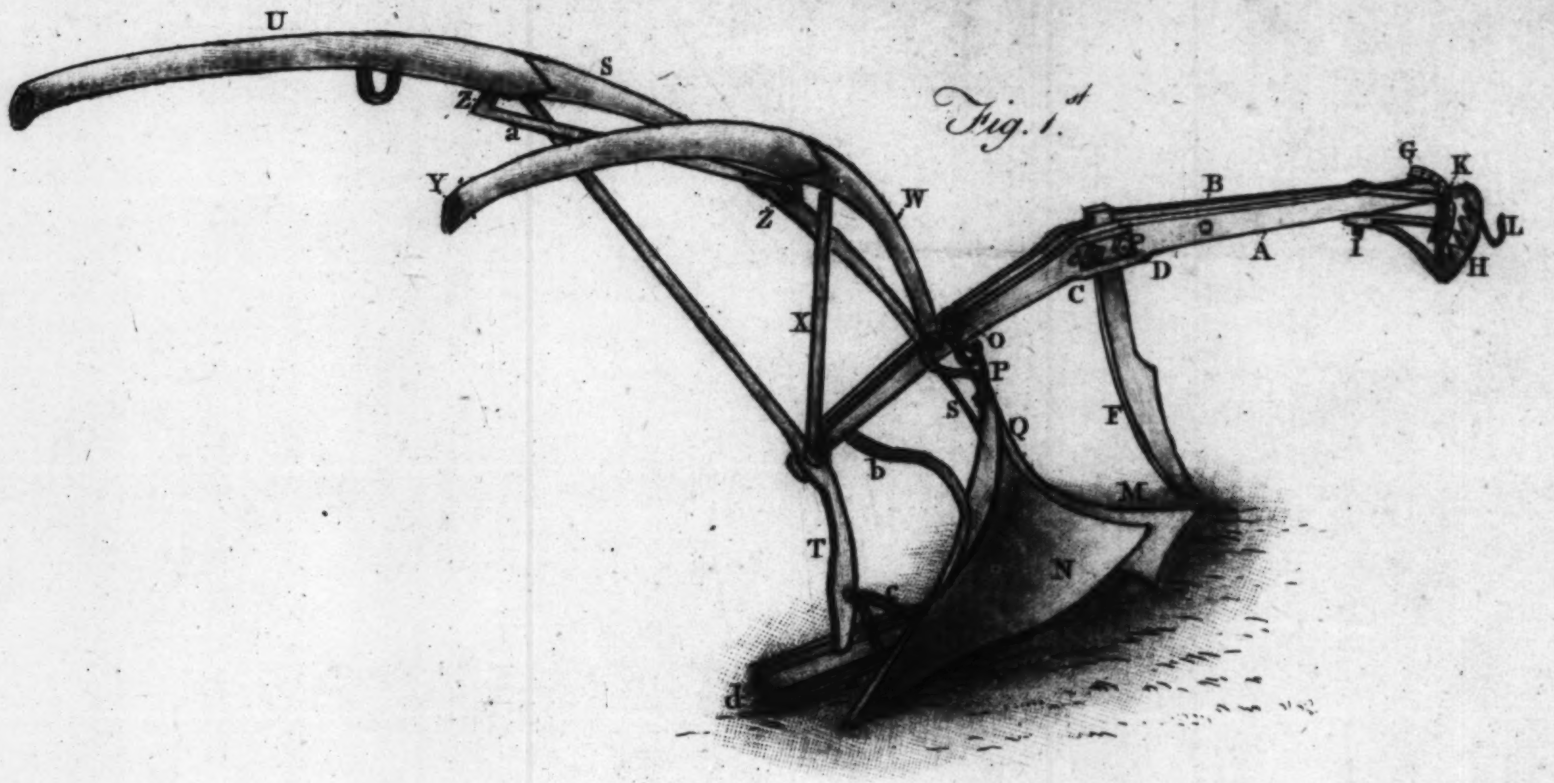

Fig. 3.

CHAP. VI.

A Perſpective View of Mr. BRAND's IRON PLOUGH,

PLATE I. FIG. 1.

A, AN Iron Beam, five feet and ſix inches long; its extreme breadth is three inches and a quarter, and three quarters of an inch thick.

B, The ſide Brace, four feet eleven inches and a half long; its extreme breadth is three inches and three quarters, and half an inch thick: this brace is faſtened to the land-ſide of the Beam with five ſcrews and nuts: this Brace, thus fixed to the Beam, forms a mortiſe, one inch and an half wide, to receive the Coulter.

C, A Mortiſe in the ſide of the Beam, and another in the ſide of the Brace, two feet nine inches diſtant from the fore end of the Beam; the Mortiſe is ſix inches and a half long, and an inch broad: by theſe Mortiſes the Coulter is ſet forward or backward at diſcretion. Note, only one of the Mortiſes is ſeen in this view.

D, An iron Guide for the Coulter, which, paſſing through the ſide and and perpendicular Mortiſes, fixes the Coulter to the Beam and Brace, by means of three ſtrong ſcrews and nuts, which paſs through the ſide Mortiſes, and through the Waſhees E, E. See Fig. 2, and 3.

E, The Waſhee, or iron plate for the nuts of the Guide to bear againſt to fix it to the Beam, &c.

F, The Coulter, one foot and eleven inches long; the extreme breadth of its blade is two inches; its ſhank is one inch and five eighths broad, and three quarters of an inch thick.

G, The Cat-head, forming a portion of a circle, whoſe radius is nine inches, with nine holes in it, by which the plough is ſet more to or from land, as need requires.

H, The Bridle, or Tug-frame, thirteen inches long from its center, on which it turns, to its fore edge; its extreme breadth is ſeven inches and a quarter, and half an inch thick, except at its center, and at the Cat-head, where it is flatted to an inch and a half, to receive the pins that faſten it to the Beam and Cat-head: in the fore part of the Bridle are nine notches, by which the plough is guided deeper or ſhallower in the ground.

I, The Center-pin, that paſſes through the Beam, and faſtens the Bridle thereto with a ſcrew and nut.

K, A taper iron Pin, that paſſes through a hole in the Bridle, or Tug-frame, and one of the holes in the Cat-head, and fixes it thereto.

L, An iron Hook, by which the plough is drawn; and by placing it in different notches in the fore end of the Bridle H, the depth of the furrow is regulated.

M, The Share; its extreme length from the point to the back end of the Sock is one foot and three inches; from the point to the back end of the Fin is eleven inches; and the extreme breadth of the Fin is ſeven inches.

N, The iron Mould-board or Breaſt-plate, two feet and ſix inches long; its extreme breadth is thirteen inches, and one tenth of an inch thick: this Breaſt-plate is bent ſo that at the back end the under edge of it projects eight inches from the back ſide of the Ground-reſt, and its upper edge projects one foot and four inches from the aforeſaid Ground-reſt.

O, An iron Fillet, ſix inches and a quarter long; its extreme breadth is two inches and a half, and three ſixteenths of an inch thick: this Fillet is faſtened, on the upper edge of the Beam, with an iron Screw and nut, juſt before the Handles, and to the inſide of the Beam by the Staple R, which, paſſing through the Beam and bent ſide of the Fillet, is fixed with a ſcrew and nut: the uſe of the Fillet is to receive the Share-hook P, by which the upper end of the Share-brace Q is fixed to its proper place. See it more plain in Fig. 2.

P, The Share-hook, four inches long, and half an inch thick; its under end is bent into a hook to receive the upper end of the Share-brace; its upper end is a ſcrew, and, paſſing through a hole in the Fillet, is faſtened thereto with an iron nut.

Q, The Share-brace, one foot and nine inches long; excluſive of its hook at the under end, an inch and a half broad, three eighths of an inch thick on its upper edge, and one ſixteenth of an inch on its under edge.

R, An iron Staple, two inches long; its extreme breadth is an inch, and a quarter of an inch thick; it is a little bent of at its lower end to embrace the upper end of the Share-brace; its ſhank, paſſing through the ſide of the Beam, is faſtened thereto as aforementioned.

S, S, The fore Sheat, and iron part of the left Handle, three feet and eleven inches long from the Ground-reſt to the top of the Socket; an inch and a half broad, and three quarters of an inch thick from the Ground-reſt to the Beam; and from the Beam to the bottom of the Socket it is three quarters by five eighths of an inch: the under end of this Sheat is rivetted to the Ground-reſt two feet and five inches diſtant from its back end: at one foot three inches and a half from its under end, it is faſtened to the Beam and Brace thirteen inches and a half diſtant from their back ends with a ſtrong ſcrew bolt and iron nut.

T, The hind Sheat, and ſupporter of the left Handle, two feet and ten inches long, an inch and a half broad, three fourths of an inch thick from the Ground-reſt to the Beam, and three fourths by five eighths from the Beam to the Socket of the Handle: this Sheat is rivetted to the Ground-reſt ſix inches diſtant from its back end, and is faſtened to the back end of the Beam and Brace with a ſtrong ſcrew bolt and nut.

U, The wooden part of the left Handle, three feet and four inches long, two inches and one fourth diameter at its lower end, and an inch and one fourth at its upper end.

W, The iron part of the right Handle; is two feet and ten inches long, three fourths of an inch broad, and five eighths of an inch thick, except at the bottom, and the Socket: this Handle is faſtened to the off-ſide of the Beam by the ſame iron bolt that faſtens the left Handle between the Beam and Brace.

X, The ſupporter of the right Handle, is two feet long, three fourths of an inch broad, and five eighths of an inch thick: the under end of this ſupporter is faſtened to the off-ſide of the back end of the Beam, with the ſame bolt as the hind Sheat, &c. is faſtened with between the Beam and ſide Brace.

Y, The wooden part of the right Handle; is three feet and four inches long, two inches and one fourth diameter at the ſocket, and one inch and one fourth at its back end.

Z, Z, Two iron Bolts, with an eye at their under ends, to receive the iron Trundle a: theſe Bolts paſs through the Sockets and Handles, and are rivetted on the upper ſide of the Sockets.

a, The iron Trundle, twelve inches and a half long from ſhoulder to ſhoulder, and five eighths of an inch diameter: each end of this Trundle has a ſcrew ſeven eighths of an inch long, which, paſſing through the eyes of the Bolts Z, Z, is faſtened thereto with two iron nuts.

b, An iron Strap, or Staple; its upper Arm is one foot long from its ſhoulder: the back end of this Arm is faſtened to the inſide of the Beam, with an iron ſcrew and nut, at four inches diſtant from its back end: the fore end of the upper Arm bears againſt the upper edge of the Mould-board, or Breaſt-plate N, four inches and a half diſtant from its back end: the under Arm is nine inches long from the ſhoulder of the ſcrew, by which it is faſtened to the hind Sheat, four inches and a half high from the upper ſide of the Ground-reſt: this Arm bears againſt the Mould-board two inches and a half diſtant from its back end, and five inches and a half up from its under edge: the Breaſt-plate is ſcrewed to the middle of the fore part of this Staple, which gives it its proper direction.

c, An iron Strap, or half Staple, which ſerves as a Brace to the Beam, and two Sheats: its upper Arm is one foot long, one inch and a half broad, and one fourth of an inch thick; the upper end of it is faſtened to the Beam by the ſcrew and nut that faſten the Staple R, and and its under end is faſtened to the fore Sheat four inches and a half high from the upper ſide of the Ground-reſt; the under arm of this Brace, or half Staple, is one foot and ſix inches long, one inch and a half broad, and one fourth of an inch thick: it is bent till it bears on the Ground-reſt, and the back end of it is faſtened to the hind Sheat four inches and a half up from the Ground-reſt, with the ſcrew and nut that faſten the under end of the Staple E.

d, The Ground-reſt; is two feet and ſix inches long, four inches and a half broad, and an inch thick; the land-ſide of which is turned up an inch and a half at the back end, and an inch at the fore Sheat; the fore end of the Ground-reſt is made taper to receive the ſock of the Share, which is faſtened to it with an iron Stud, rivetted on the Ground-reſt, and the hook at the bottom of the Share-brace.

e, A ſmall Wing, welded on the fore end of the Ground-reſt to ſupport the fore end of the Breaſt-plate. See Fig. 4.

F I G. 2.

A Geometrical Plan of the PLOUGH.

A,	The Beam:
B,	The ſide Brace.
C,	The Mortiſe in the ſide of the Beam, not ſeen in this view of the Plough.
D,	The iron Guide of the Coulter. See Fig. 3.
E, E,	The two Waſhees. See Fig. 4.
F,	The Coulter. See more plain in Fig. 1, and 4.
G,	The Cat-head, forming a portion of a circle, as deſcribed in Fig. 1.
H,	The Bridle, or Tug-frame. See Fig. 1.
I,	The Center-pin of the Bridle. See Fig. 1.
K,	The taper Pin, that fixes the Bridle to the Beam in a proper direction.
L,	The iron Hook, by which the Plough is drawn. See Fig. 1, and 4.
M,	The Share, deſcribed in Fig. 1, and 4.
N,	The Mould-board. See Fig. 1, and 4.
O,	The Fillet, deſcribed in Fig. 1.
S, T,	The iron part of the left Handle. See Fig. 1.
U,	The wooden part of the left Handle. See Fig. 1, and 4.
W,	The iron part of the right Handle. See Fig. 1, and 4.
X,	The Supporters of the right Handle. See Fig. 1, and 4.
Y,	The wooden part of the right Handle. See Fig. 1, and 4.
a,	The iron Trundle. See Fig. 1, and 4.
b,	The iron Strap, or Staple. See Fig. 1, and 4.

F I G. 3.

A Plan of the GUIDE, *with one of its* WASHEES.

D,	The Guide.
E,	The hind Waſhee.

PLATE II. FIG. 4.

A Perſpective View of the Land-ſide of the PLOUGH.

A,	The Beam. See Fig. 1, and 2.
B,	The Side-brace. See Fig. 1, and 2.
C,	The Mortiſe in the ſide of the Side-brace.
D,	The Guide. Note, only the ſcrew and nut of it are ſeen in this View.
E,	One of the Waſhees.
F,	The Coulter. See Fig. 1.
G,	The Cat-head. See Fig. 1, and 2.

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Plate 2d.

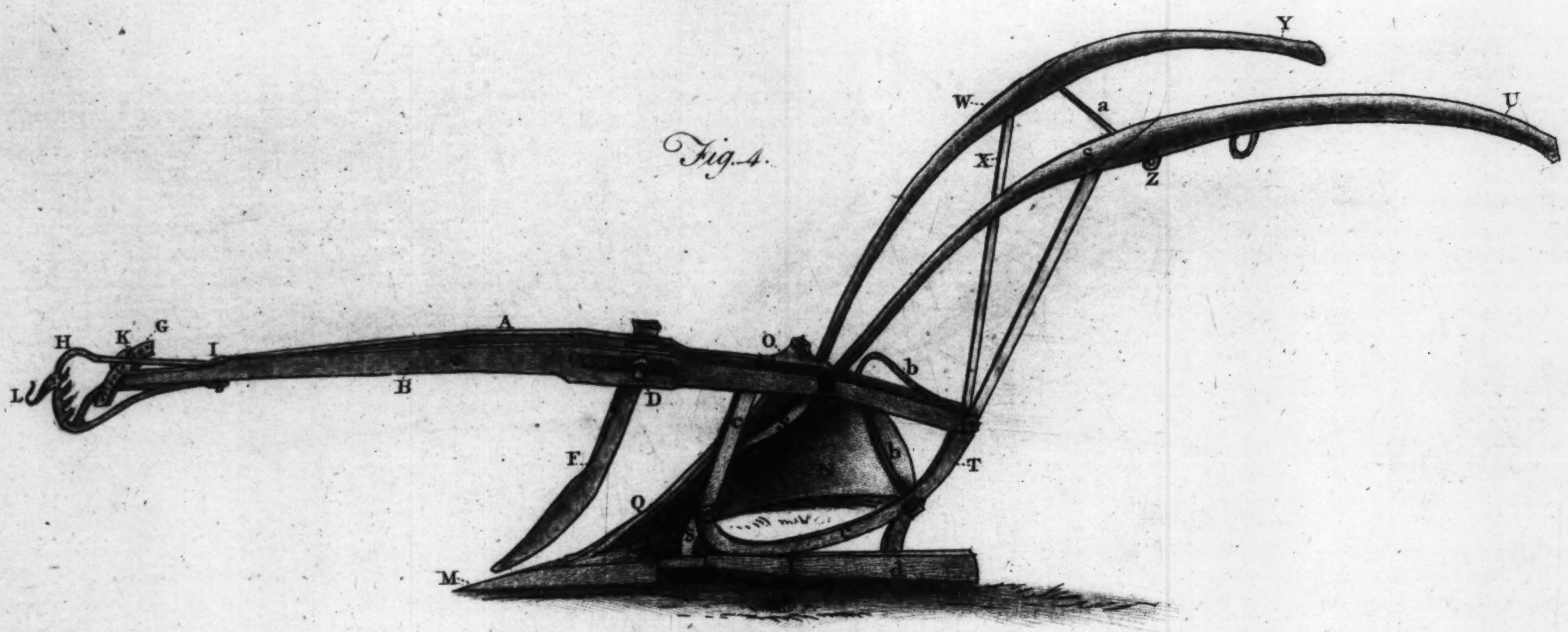

Fig. 4.

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Plate 1.

Meſs.rs Hope & Clares Drill-plough.

Fig. 1.

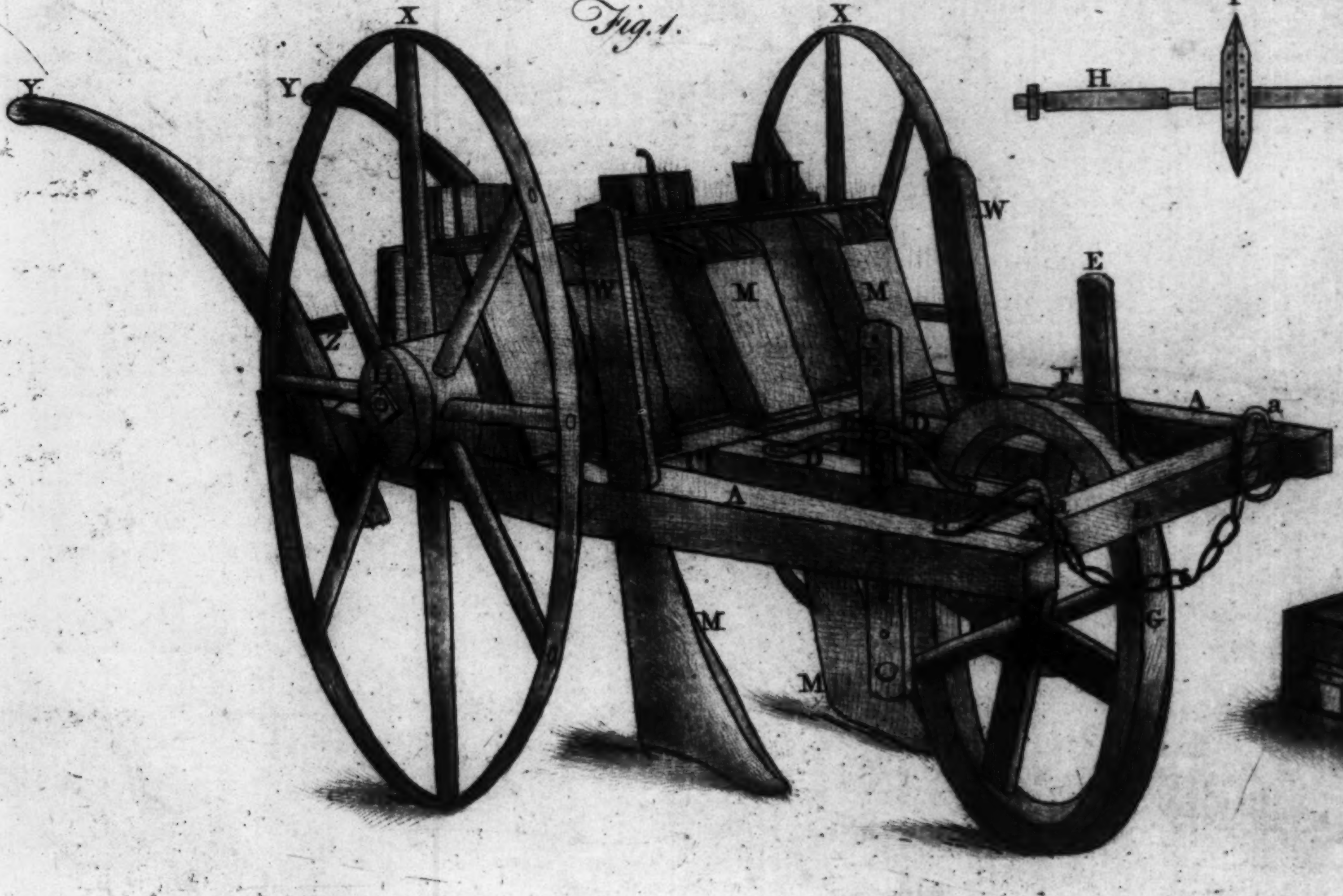


Fig. 2.

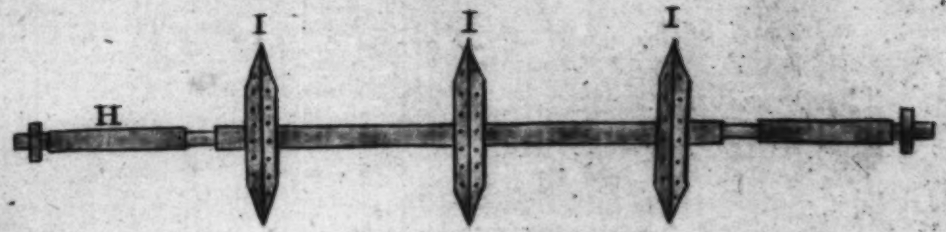
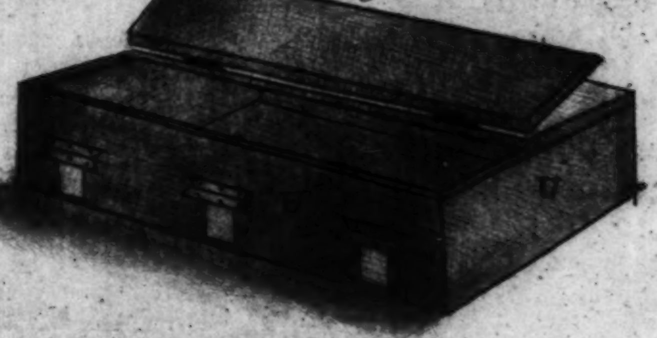


Fig. 3.



H, The Bridle. See Fig. 1, and 2.

I, The Center-pin of the Bridle. See Fig. 1, and 2.

K, The taper Pin. See Fig. 1, and 2.

L, The Hook. See Fig. 1, and 2.

M, The point of the Share, more fully ſeen in Fig. 1, and 2.

N, The Breaſt-plate. See Fig. 1, and 2.

O, The Fillet. See Fig. 2.

Q, The Share-brace.

S, The fore Sheat, and iron part of the left Handle, as deſcribed in Fig. 1.

T, The hind Sheat, and ſupporter of the left Handle, deſcribed in Fig. 1.

U, The wooden part of the left Handle. See Fig. 1, and 2.

W, The iron part of the right Handle. See Fig. 1, and 2.

X, The ſupporter of the right Handle. See Fig. 1, and 2.

Y, The wooden part of the right Handle. See Fig. 1, and 2.

Z, One of the iron Bolts, to which the Trundle a is faſtened. See Fig. 1.

a, The iron Trundle, deſcribed in Fig. 1.

b, b, The iron Strap, or Staple, for ſupporting the back end of the Breaſt-plate, deſcribed in Fig. 1.

c, c, The iron Strap, or half Staple, deſcribed in Fig. 1.

d, The Ground-reſt, deſcribed in Fig. 1.

e, A ſmall Hook, or Wing, welded on the Ground-reſt, to ſupport the fore point of the Breaſt-plate, deſcribed in Fig. 1.

This Plough was tried at *Morden* in *Surry, May* 10, 1773, when the Committee were of opinion that it was ſuperior to the other Ploughs that were tried againſt it, on account of its moving a greater quantity of earth with equal force, as being made of iron more durable, and leſs liable to be out of order; as, admitting of being taken to pieces, all the parts may be eaſily repaired, in the form of the Copſe, and in the mode of adjuſting the Coulter.

The Committee recommended to the Society to give Mr. *Brand* a bounty of Twenty Guineas, he leaving the Plough with the Society for the uſe of the public, to which the Society agreed, *May* 12, 1773.

CHAP. VII.

A Perſpective View of the DRILL-PLOUGH *for* HORSE-BEANS, *invented by Meſſrs.* THOMAS HOPE *and* PETER CLARE, *of* Eccles, *near* Mancheſter, *taken from the fore End and the right Side of the Plough.*

PLATE I. FIG. 1.

A, A, THE ſide rails; five feet eight inches long, two inches and a half broad, and two inches thick.

B, The fore end Rail; two feet five inches and a half long, from ſhoulder to ſhoulder; two inches broad, and one inch and a half thick; is tenoned into the ſide Rails three inches from their fore ends.

C, The middle Rail; two feet five inches and a half long, from ſhoulder to ſhoulder; four inches and one fourth broad, and three inches and three fourths thick: this Rail is tenoned into the ſide Rails, three feet two inches diſtant from their fore ends. See Plate 3, Fig. 5.

D, D, Two Rails; two feet eight inches and three fourths long, from ſhoulder to ſhoulder of their tenons; two inches broad, and one inch and a half thick: theſe Rails are mortiſed into the fore end Rail, and the middle Rail, ſeven inches and a half diſtant from the inner edges of the ſide Rails. See Plate 3, Fig. 5.

E, E, Two wooden Sliders; one foot four inches long, one inch and three fourths broad, and three fourths of an inch thick: theſe Sliders paſs through a mortiſe in each of the Rails D, D, thirteen inches and a half diſtant from their fore tenons, and alſo through mortiſes in the curved Irons F, F, to which they are faſtened with iron pins; the under ends of the Sliders receive the axis, or pivots, of the fore wheel, which, by ſhifting the iron pins into the different holes in the Sliders, is raiſed or depreſſed according to the depth required for ſowing. See plate 2, Fig. 4, and plate 3, Fig. 5.

F, F, The two curved Irons, faſtened to the Rails D, D, to ſupport the Slider E, E, &c. as before mentioned.

G, The fore wheel; one foot ſeven inches and a half diameter, and two inches on its rim.

H, The iron axis of the hind Wheels; is four feet two inches long, and an inch ſquare, with a ſcrew and nut at each end, to prevent the Wheels from comeing off: it is filed round over the ſide Rails, and revolves on two brackets fixed on their upper ſides, with ſcrew-bolts on their axis. See Fig. 2.

I, I, I, The three Wheels, by which the beans are delivered into the trunks, or conveyances, M, M, M: theſe Wheels are eleven inches in diameter, and one inch and a half thick; their edge or rim forms an angle with holes or ſockets on each ſide of the angle, the ſize of a ſingle Beam. See Fig. 2.

K, K, Two Brackets; each of which is divided into two parts, to embrace the ſpindle of the iron axis: the Brackets are eight inches long, their extreme breadth is five inches, and two inches thick; they are faſtened to the upper ſurface of the ſide Rail before mentioned, four feet one inch diſtant from their fore ends to the center of the Brackets, with ſtrong iron bolts, ſcrews, and nuts L, L, &c. See plate 2. Fig. 4.

L, L, &c. The iron bolts; nine inches long, and half an inch thick, whoſe upper ends are ſcrewed, and nuts put thereon, to fix the Brackets.

M, M, M, The three Trunks or conveyances, which receive the Beans from the Wheels and convey them into the ground: theſe conveyances are divided into two lengths, each; the upper parts are eleven inches long, four inches and a half broad, and two inches and a half deep at their upper ends, and two inches and a half ſquare at their under ends; they are faſtened to the fore ſide of the ſeed-box: the under parts of the conveyances are one foot four inches and a half long, and two inches and a half ſquare at their upper ends, which are fixed in a mortiſe in the middle Croſs-rail: their under ends are formed like ſhares, to make the furrows for the corn, and are covered with iron plate.

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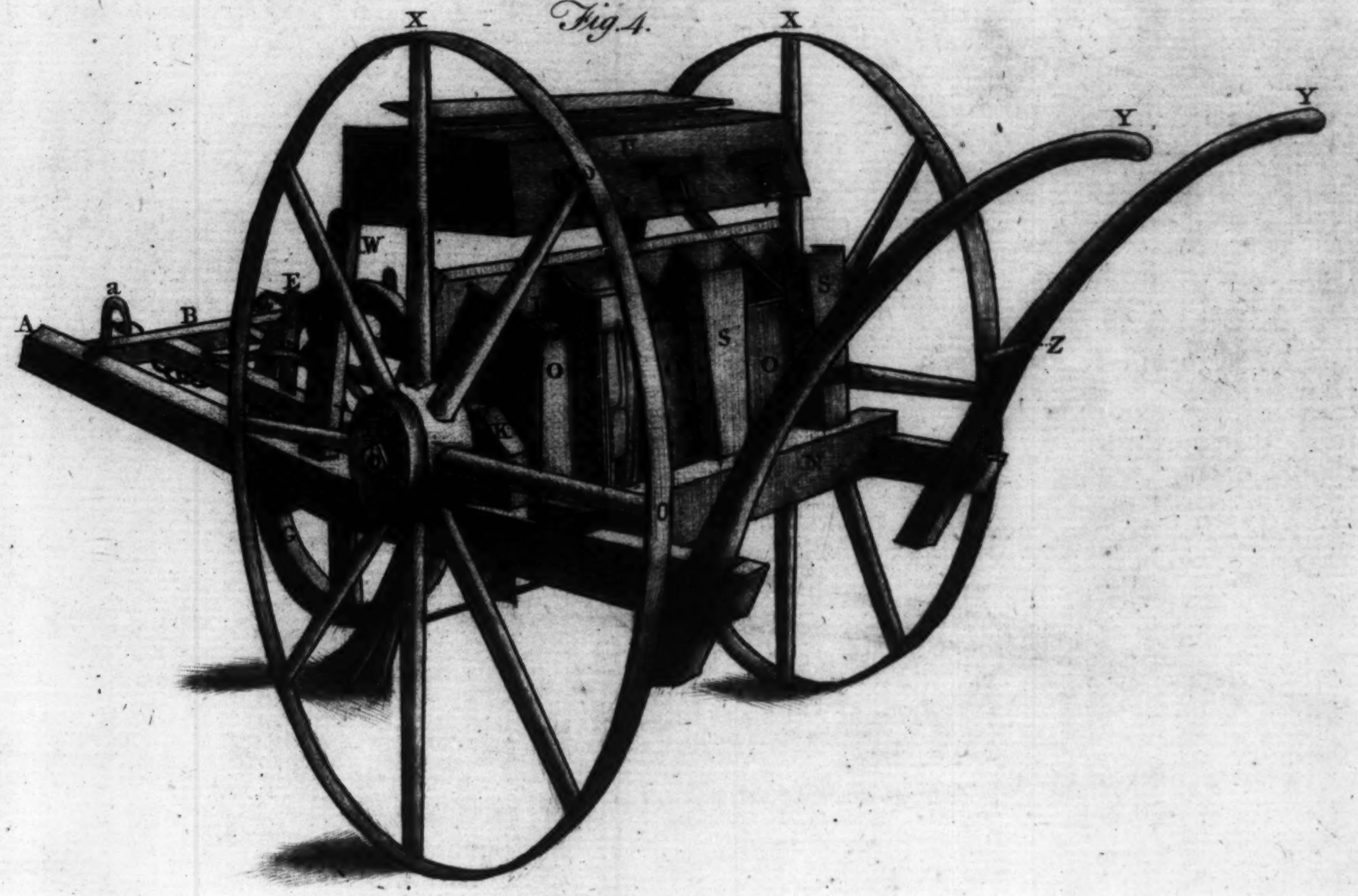
Plate. 2.

Fig. 4.



W, W, Two upright Poſts, one foot two inches long, three inches broad, and one inch and three fourths thick, mortiſed into the upper edges of the ſide Rails two feet ten inches from their fore ends; theſe Poſts ſupport the reſervoir, by means of the two pivots, which paſs in their upper ends.

X, X, The two hind Wheels; are three feet ten inches diameter, and one inch and a half on their rims.

Y, Y, The Handles of the Plough; are three feet four inchs long, three inches broad, and two inches thick, where they are halved to the ends of the ſide Rails, gradually diminiſhing to their upper end, where they are one inch and one fourth diameter.

Z, Z, Two Trundles; ſix inches long, and one inch and one fourth diameter, by which the Plough is to be lifted, to turn it about.

FIG. 2.

A Plan of the IRON AXIS *of the hind* WHEELS, *with the* WHEELS *that deliver the Beans into the Trunks,* &c.

H, The iron Axis, deſcribed in Fig. 1.

I, I, I, The three Seed-wheels, deſcribed in Fig. 1.

FIG. 3.

A Perſpective View of the RESERVOIR, *or* SEED-BOX.

U, The reſervior, or Seed-box, that ſupplies the cells; is two feet and ten inches long, one foot and ſix inches broad, and ſix inches deep. See Plate 2, Fig. 4, and 5.

PLATE II. FIG. 4.

A Perſpective View of Meſſrs. HOPE *and* CLARE's DRILL-PLOUGH, *taken from the back End and Left-hand Side of the* PLOUGH.

A, A, The ſide Rails of the Plough. See Plate 1, Fig. 1, and Plate 3, Fig. 5.

B, The fore-end Rail. See Plate 1, Fig. 1, and Plate 3, Fig. 5.

C, The middle Rail. See Plate 1, Fig. 1.

D, D, The two inner Rails. See Plate 1, Fig. 1, and Plate 3, Fig. 5.

E, E, The two Sliders, to which the axis of the fore Wheel is connected. See Plate 1, Fig. 1, and Plate 3, Fig. 5.

F, F, The curved iron Arms, by which the fore Wheel is regulated. See Plate 1, Fig. 1, and Plate 3, Fig. 5.

G, The fore Wheel. See Plate 1, Fig. 1, and Plate 3, Fig. 5.

H, The axis of the hind Wheels. See Plate 1, Fig. 2.

I, The Wheels, that deliver the beans into the Trunks. See Plate 1, Fig. 2.

K, One

K, One of the Brackets, in which the axis of the hind Wheels revolves. See the deſcription, Plate 1, Fig. 1.

M, The under part of one of the Trunks, that conveys the beans into the furrows. See Plate 1, Fig. 1, and Plate 3, Fig. 5.

N, The hind Rail of the Plough, is two feet and eleven inches long, four inches broad. and two inches and three fourths thick, fixed with double tenons to the ſide Rails ten inches diſtant from their back ends.

O, The hind ſide of the Seed-box, is two feet and ten inches long, eleven inches broad, and three fourths of an inch think, faſtened to the inſide of the hind Rail N. N. B. There is a Board, two feet and ten inches long, one foot two inches and a half broad, and half an inch thick, faſtened to the under edges of the ſide Rails, middle and hind Rail, with wooden ſcrews, to make the bottom of the Seed-box.

P, P, The ends of the Seed-box, are twelve inches and three fourths long at their under edges, where they bear on the ſide Rails; five inches and a half long at their upper edges, eight inches broad, and half an inch thick.

R, R, R, R, Four Partitions, which divide the Seed-box into three cells.

S, S, S, The three Trunks, at the hind ſide of the Seed-box; nine inches and a half long, ſour inches and a half broad, and two inches deep at their upper ends, and three inches broad, and two inches deep at their under ends.

T, An iron Slider, by which the quantity of beans are regulated in the Sills.

U, The Reſervoir. See Plate 4, Fig. 3.

X, The hind Wheels.

Y, Y, The Handles.

Z One of the Trundles, by which the Plough is lifted to turn it about.

A Geometrical Plan of the PLOUGH.

PLATE III. FIG. 5.

A, A, The ſide Rails of the Plough.

B, The fore end Rail.

C, The middle Rail.

D, D, The two inner Rails.

E, E, The Sliders, to which the Axis of the fore Wheel is connected. See Plate 1, Fig. 1. and Plate 2, Fig. 4.

G, The fore Wheel.

H, The Axis of the hind Wheel. See Plate 1, Fig. 2.

K, K, The Brackets, in which the Axis of the hind Wheels revolves. See Plate 2, Fig. 4.

L, The iron Bolts, that faſten the Bracket to the ſide Rails.

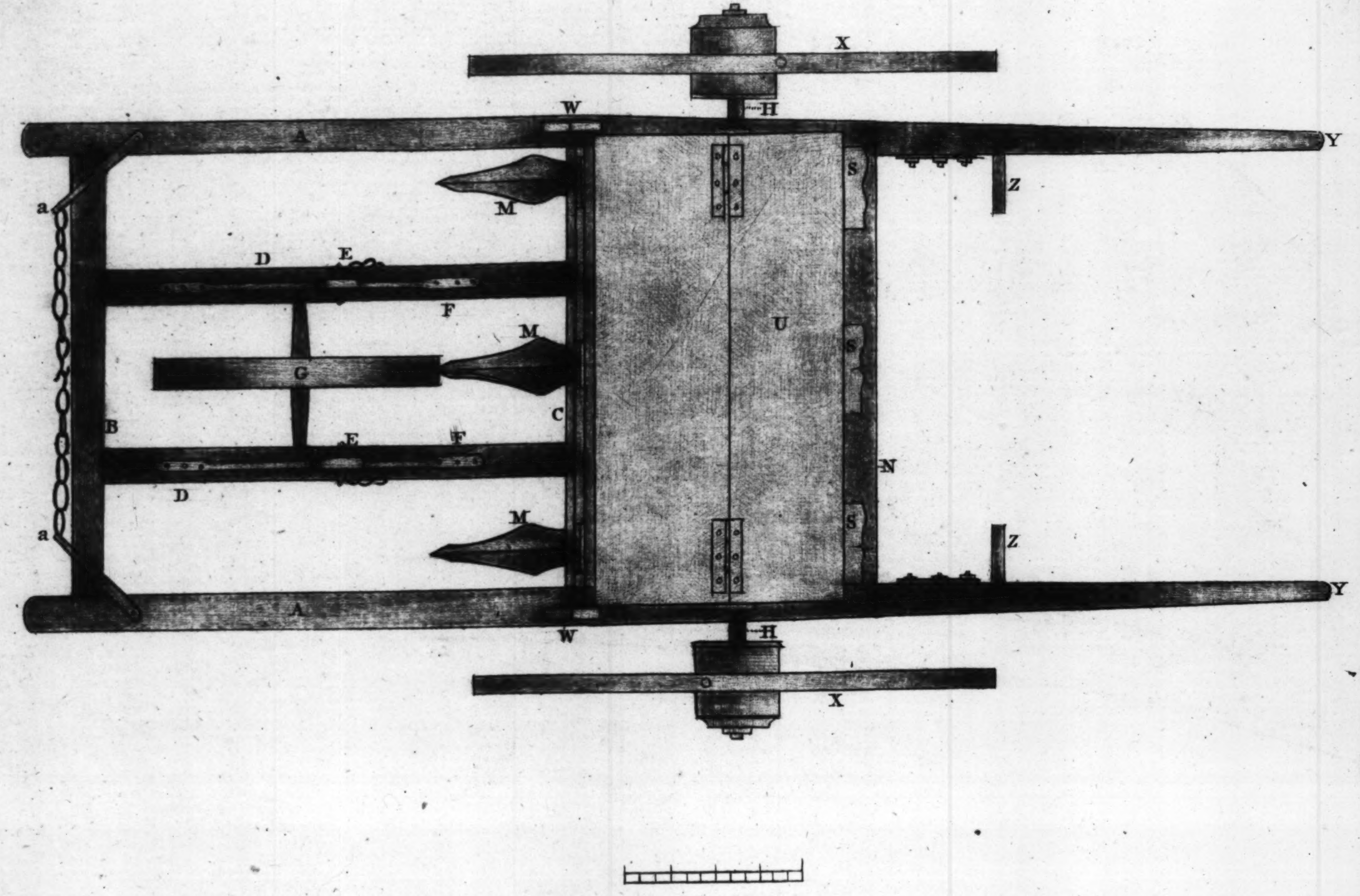
M, The under parts of the Trunks.

N. The hind Rail of the Plough.

S, S, S, The Trunks, that convey the ſeed from the reſervoir into the cells.

U, The reſervoir, or Seed-box

Plate 3. Fig. 5.



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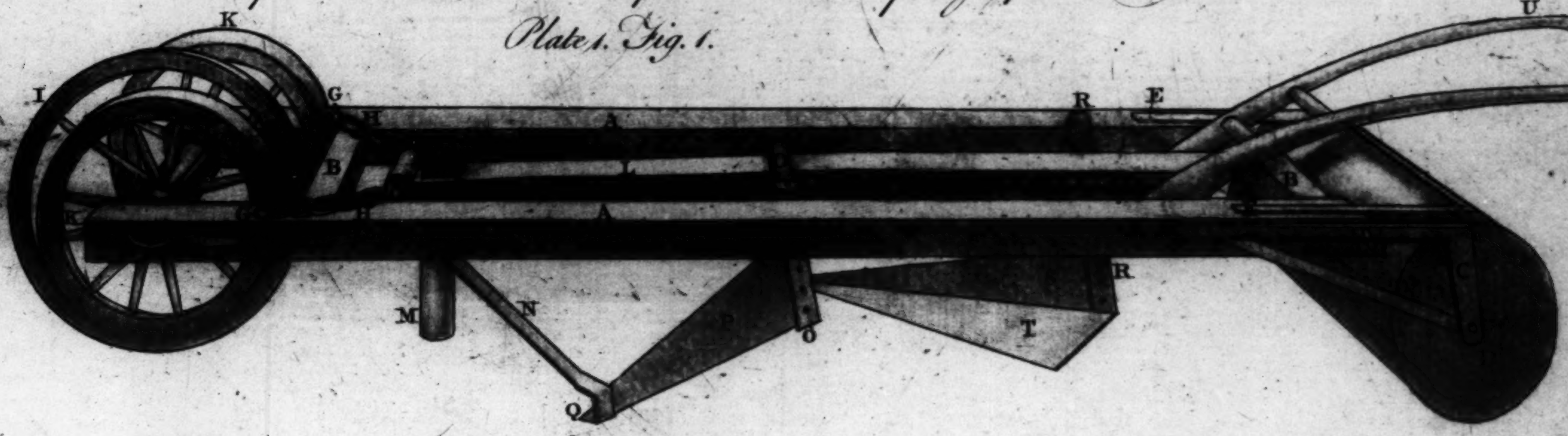
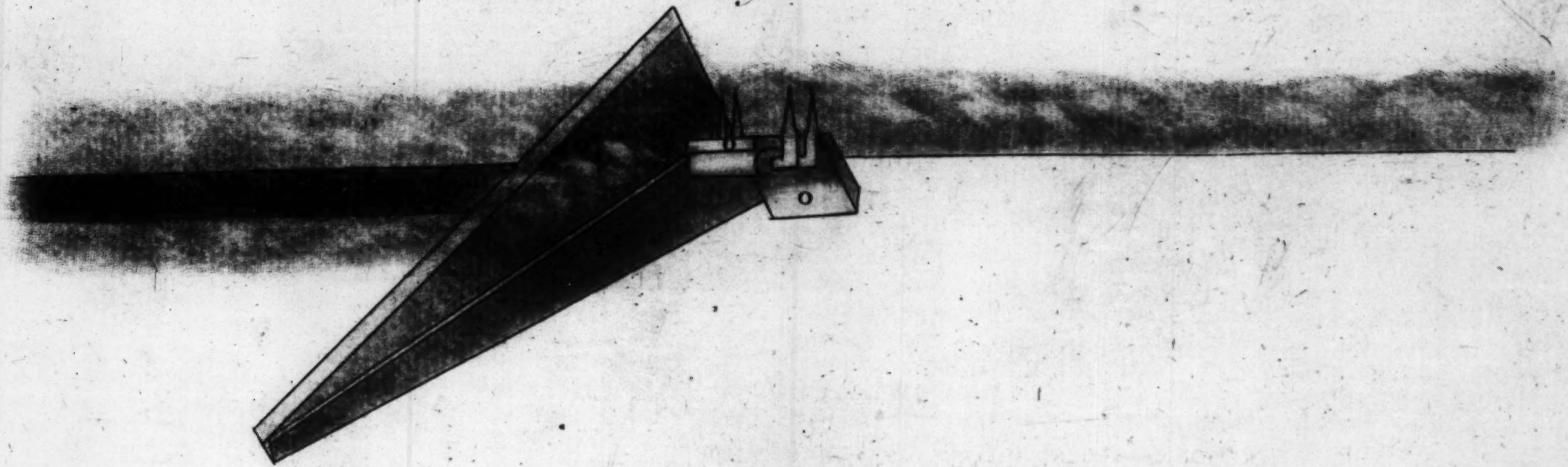
Perspective View of Mr. Christopher Pinchback's plough for Mending Roads.

Plate 1. Fig. 1.



A Plan of the Shares, Sheet, Staples and Wedg.

Fig. 2.



W, W, The upright Poſts, that ſupport the fore end of the reſervoir.

X, X, The hind Wheels.

Y, Y, The Handles of the Plough.

Z, Z, Two Trundles, by which the Plough is lifted.

a, a, The two Braces, by which the Plough is drawn.

This Plough was tried at *Morden* in *Surry*, *May* 10, 1773, when the Committee was of opinion that it was preferable to the other Ploughs for Horſe-beans, as it dropped the Beans of a more regular thickneſs; therefore reſolved that it was deſerving the premium offered, being Twenty Pounds, to which the Society agreed 1773.

CHAP. VIII.

A Deſcription of Mr. CHRISTOPHER PINCHBECK's **PLOUGH** *for mending Roads.*

PLATE I. FIG. 1.

A, A, THE two ſide Rails of the Frame, to which the Plough is faſtened with Chains and Hooks: theſe Rails are twelve feet ten inches and a half long, four inches and three fourths broad, and three inches and three fourths thick.

B, B, The end Rails of the Frame; are two feet two inches and three fourths long from ſhoulder to ſhoulder of their tenons four inches and three fourths broad, and three inches and three fourths thick: the fore Rail is mortiſed into the ſide Rails two feet and ſix inches diſtant from their fore ends: the hind Rail is mortiſed into the ſide Rails three inches and one fourth diſtant from their back ends.

C, C, Two iron Frames, or Brackets, two feet and one inch long; their extreme breadth, from the upper part of the back end to the center of the Roller's axis, is ten inches and half an inch thick.

D, An iron Roller, two feet diameter, and two feet nine inches and a half broad.

E, E, The two iron Arms of the Scraper; are two feet and eleven inches long, two inches broad, and half an inch thick: theſe Arms are faſtened, on the upper edges of the ſide Rails, with ſtrong iron wood ſcrews:[*] to the back end of theſe Arms is rivetted an iron Plate, or Scraper, three feet long, two inches and three fourths broad, and one fourth of an inch thick: the under edge of the Scraper bears on the iron Roller, to ſcrape off the earth or gravel that may adhere to it.

F, One of the Staples, to which the horſes are hooked, to draw the Plough.

G, G, Two ſtrong iron Hooks, driven tight through the upper edge of the ſide Rails, one foot and ſeven inches diſtant from their fore ends, and faſtened to their under edges with feathered keys: the upper ends of theſe Hooks are three fourths of an inch ſquare: they are bent parallel to the ſide Rails, two inches in

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[*] This word, tho' not to be found in the Dictionary, is, nevertheleſs, well underſtood by all workmen.

length, and then turned up to form a Hook half an inch thick, on which the ſore links of the Chains H, H, are fixed.

H, H, Two ſtrong iron Chains; the fore ends of which are faſtened to the Hooks G, G, and their back ends to the Cat-head, or fore end of the Beam of the Plough, with an iron Bolt.

I, The middle Wheel of the Plough, which is to go in the rut to be mended: this Wheel is four feet and three inches diameter, having an iron axis, an inch ſquare, driven through its nave, and turns on two pivots in the fore end of the ſide Rails.

K, K, Two Wheels, three feet and eight inches diameter; fixed on the ſame nave as the Wheel I: their uſe is to prevent the middle Wheel from ſinking too deep in the rut.

L, The Beam, eight feet and ſix inches long, ſeven inches broad at the tail-end, five inches cloſe behind the Cat-head, and four inches and a half thick from end to end.

M, The Coulter, two feet and three inches long, three inches broad, and half an inch thick: this Coulter is fixed in a mortiſe, cloſe behind the Cat-head of the Beam, with a Wedge: its ſides below the Beam are thicker on the middle than on the edges, and, paſſing through the rut, prevent the Plough from getting out of its work.

N, An iron Brace, or Stay, three feet and ſix inches long, two inches broad, and one fourth of an inch thick: the upper end of this Brace is faſtened to the Cat-head of the Beam with an iron bolt and wedge; and the other end of it is fixed to the fore end of the fore Share, three inches behind its point, with a ſcrew and nut.

O, The fore Sheet: it is made of iron, and is two feet and five inches long, three inches broad, and five eighths of an inch thick: this Sheet is faſtened to the near ſide of the Beam, four feet and four inches from its fore end, with two ſtrong ſtaples, which are driven through the Beam, and are faſtened thereto on the off-ſide with ſcrews and nuts, and between the ſtaples with a ſtrong iron bolt and key, and is ſet to an angle of 75 degrees: the under end of this Sheet is bent, ſo as to project two inches before its upper end.

P, The back Plate of the fore Share: it is three feet long, two inches broad at its point, or fore end; one foot broad at its back end, where it is rivetted to the Sheat; and three eighths of an inch thick.

Q, The bottom of the fore Share: it is two feet eight inches long; two inches broad at the fore end, eleven inches behind, and three eighths of an inch thick: the fore end of the Share projects one foot three inches from the perpendicular of the near ſide of the Beam.

R, The hind Sheat, made of iron, is two feet five inches long, three inches broad, and three eighths of an inch thick: this Sheet is faſtened to the off-ſide of the Beam, one foot from its back end, and is faſtened thereto with two iron ſtaples, driven through the Beam, and ſcrewed on the near ſide of the Beam, and a ſtrong iron bolt in the middle between the two ſtaples: this Sheet is bent the reverſe to the Sheat O, and forms an angle with the horizon of ſeventy-five degrees.

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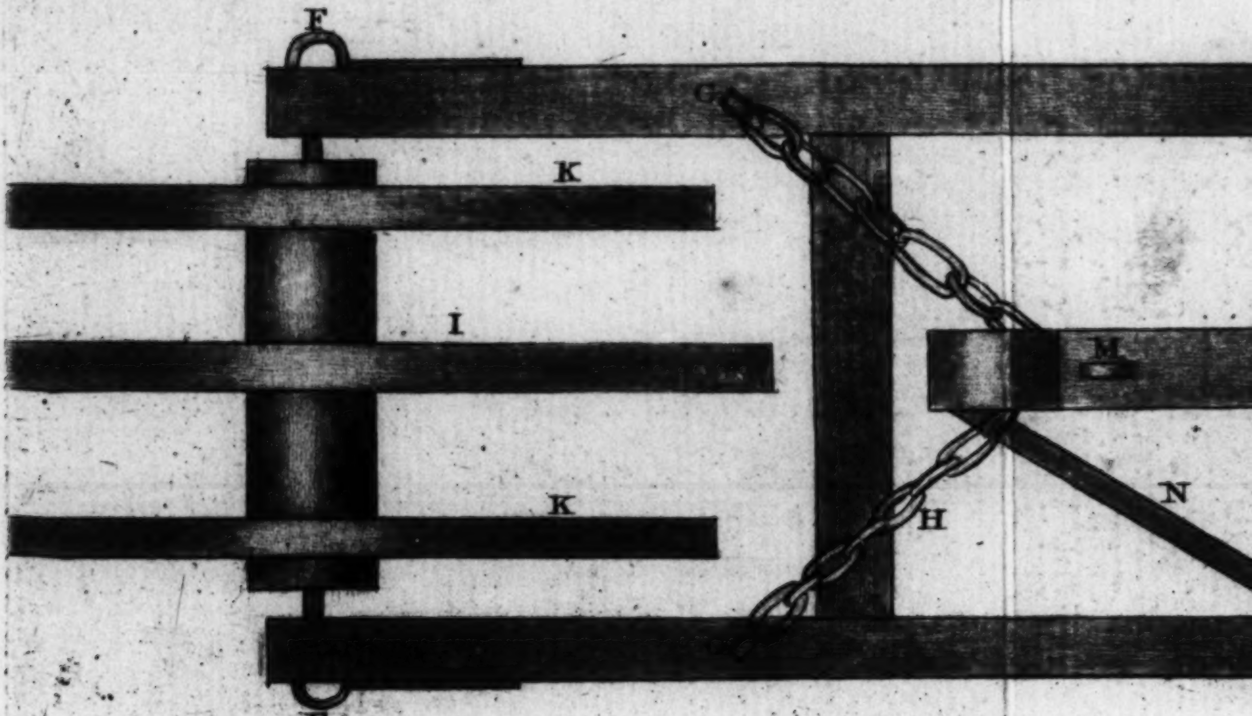
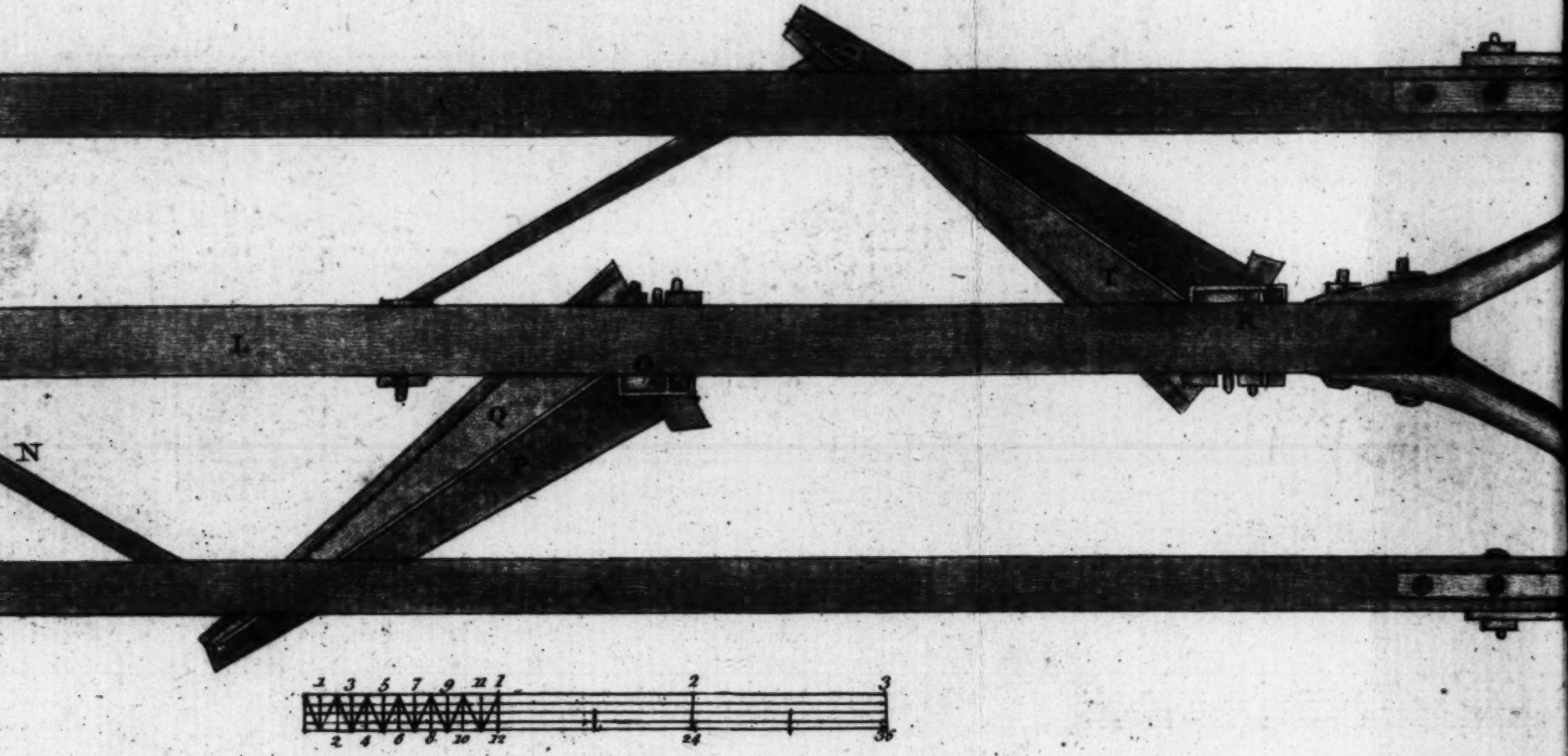
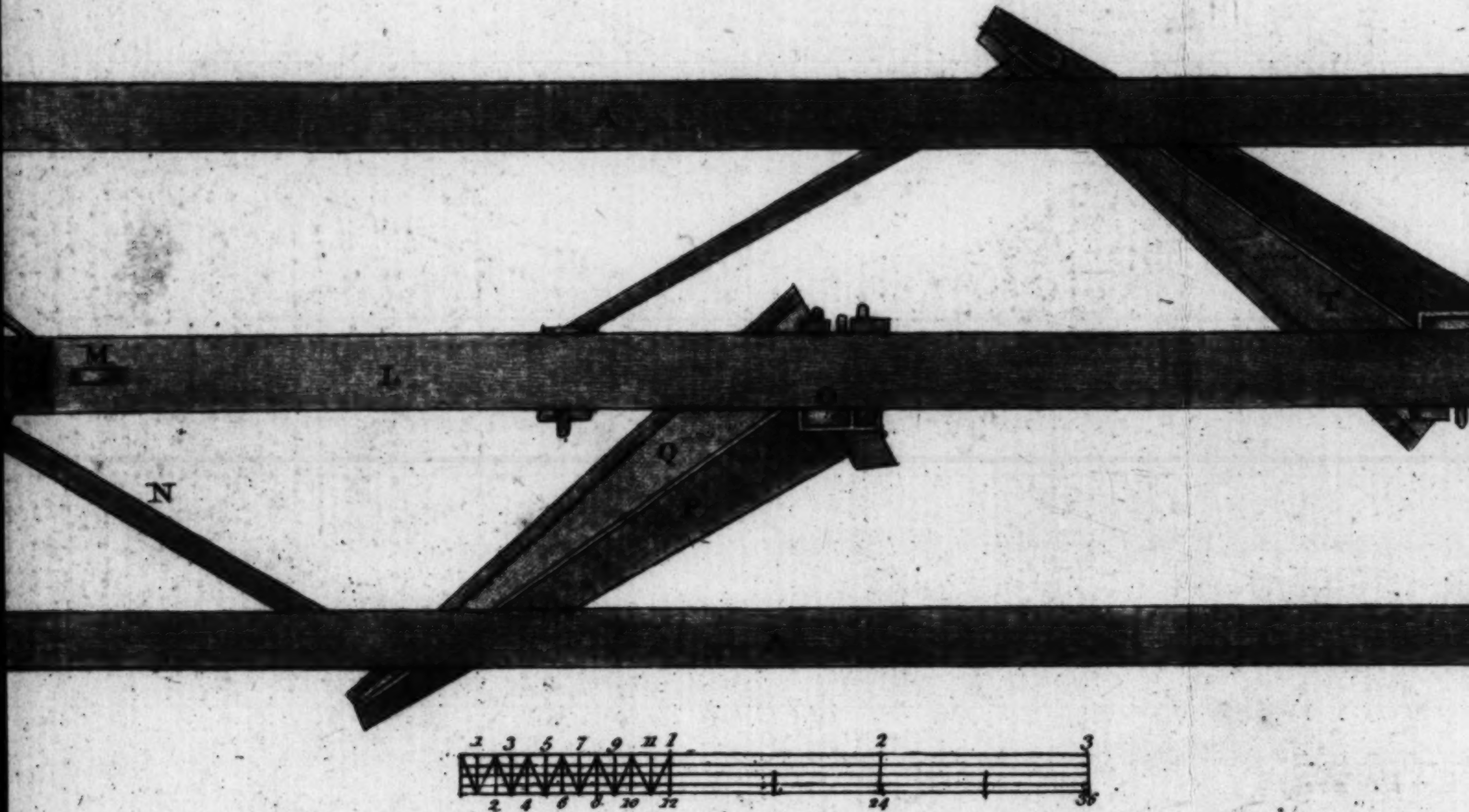
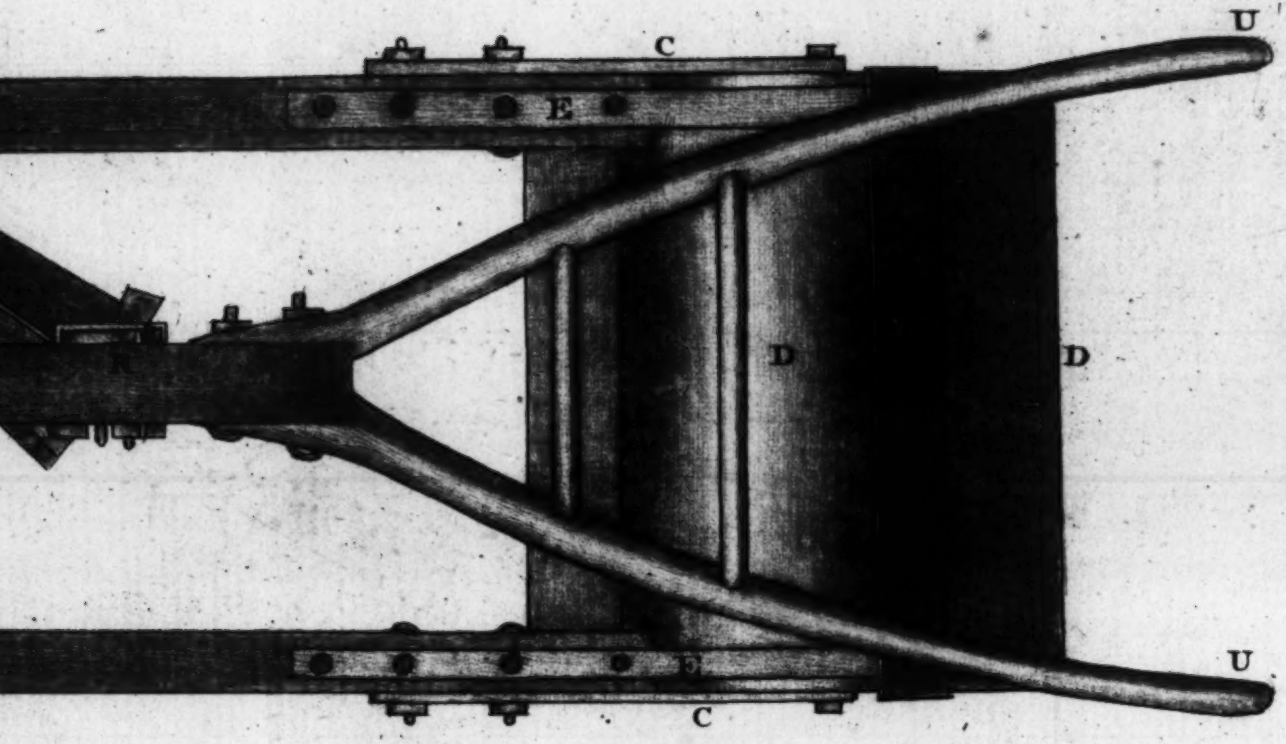


Plan of Mr. Pinchbeck's Plough.



Plan of Mr. Pinchbeck's Plough.




C
E
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F

S, The back Plate of the hind Share: it is three feet long, two inches broad before, and one foot at its hinder end, where it is rivetted to the Sheet: the fore end of this Share projects one foot three inches from the perpendicular of the off-ſide of the Beam.

T, The bottom of the hind Share: it is of the ſame dimenſions as the bottom of the fore Share.

U, U, The two Handles of the Plough, five feet two inches long; faſtened to the back end of the Beam with two iron bolts and ſcrews: the back ends of the Handles are three feet and two inches aſunder.

FIG. 2.

A Plan of the Fore SHARE *and* SHEET.

O,	The Sheet, with its two Staples, and Wedge.
P,	The back Plate of the Share.
Q,	The bottom of the Share.

PLATE II. FIG. 3.

A Geometrical Plan of the PLOUGH.

A, A,	The ſide Rails. See Plate I, Fig. I.
B, B,	The end Rails.
C, C,	The iron Frames, or Brackets.
D,	The caſt iron Roller.
E, E,	The two Arms of the Scraper.
F, F,	The Staples, by which the Plough is drawn.
G, G,	The iron Hooks, by which the Plough is connected to the Frame.
H, H,	The two Irons, by which the Plough is drawn.
I,	The middle Wheel, which goes in the rut to guide the Plough in its work.
K, K,	The ſide Wheels, which prevent the middle Wheel from ſinking too deep in the rut.
L,	The Beam.
M,	The Coulter.
N,	The Brace of the Coulter.
O,	The fore Sheet.
P,	The back Plate of the fore Share.
Q,	The bottom Plate of the fore Share.
R,	The hind Wheel.
S,	The back Plate of the hind Share.
T,	The bottom Plate of the hind Share.
U, U,	The Handles of the Plough.

This Plough was tried on a piece of road one hundred and eighty-three yards in length, on the ſouth ſide of the great road near *Turnham-Green*, *March* 26, 1774; the road full of flints. The Plough made three turns in mending it, which was done in nine minutes.—The joint Committees of Agriculture and Mechanics, after ſeveral trials, were of opinion the Plough perfectly anſwered the purpoſe of filling and levelling deep ruts, and recommended to the Society to give *Mr. Pinchbeck* a gold Medal, which was agreed to by the Society, *June* 1, 1774.

CHAP. IX.

A Deſcription of Mr. Stephen Smith's MACHINE *for cutting* Straw, *&c.*

PLATE I. FIG. 1.

A Perſpective View of the Machine, *taken from the Front.*

A, A ſteel Plate or Knife of the ſhape of an §, which forms a double Knife, of a ſpiral form, enlarging its radius, which is three inches and a half at the axis, and one foot four inches and a half at the points, and is one fourth of an inch thick on the back edges.

B, A caſt iron Block, nearly the ſhape of the Knife; its extreme breadth is four inches and a half, and its extreme thickneſs one inch and one eighth: to this Block the ſteel Plate or Knife is fixed, with eight flat-headed ſcrews.

C, An iron Axis, two feet nine inches and one eighth long, from the point of the ſcrew at the fore end to the point of the ſcrew at its back end: the fore end of this Axis, for the length of four inches and a half, is one inch and one eighth ſquare, on which ſquare the Knife A, the Fly D, and Winch E, are fixed: at the end of the ſquare is a Shoulder, or Collar, for the Knife to bear againſt: this Collar is two inches diameter, and half an inch thick: from the back end of the Collar it forms a pivot one inch and a half long; and, from the end of the pivot, it is made ſquare, four inches long, on which ſquare the Tumblers G and H are fixed with ſcrews: from the end of the ſquare, one foot five inches and a half long, it is octagonal; and, from the end of the octagonal part, it is three fourths of an inch ſquare, for the length of two inches and a half; on which ſquare is fixed the ſpiral Screw, or Worm W, which is one inch and a half diameter: from the end of this ſquare, it forms the back pivot and ſcrew, which is an inch and a half long, and half an inch diameter. Note, only the fore end of the Axis is ſeen in this view.

D, The Fly, whoſe radius is one foot and three inches: its Arms are ſeven eighths of an inch thick octagonal; the extremity of each Arm is loaded with about ſeven pounds weight.

E, The Winch: its radius is thirteen inches.

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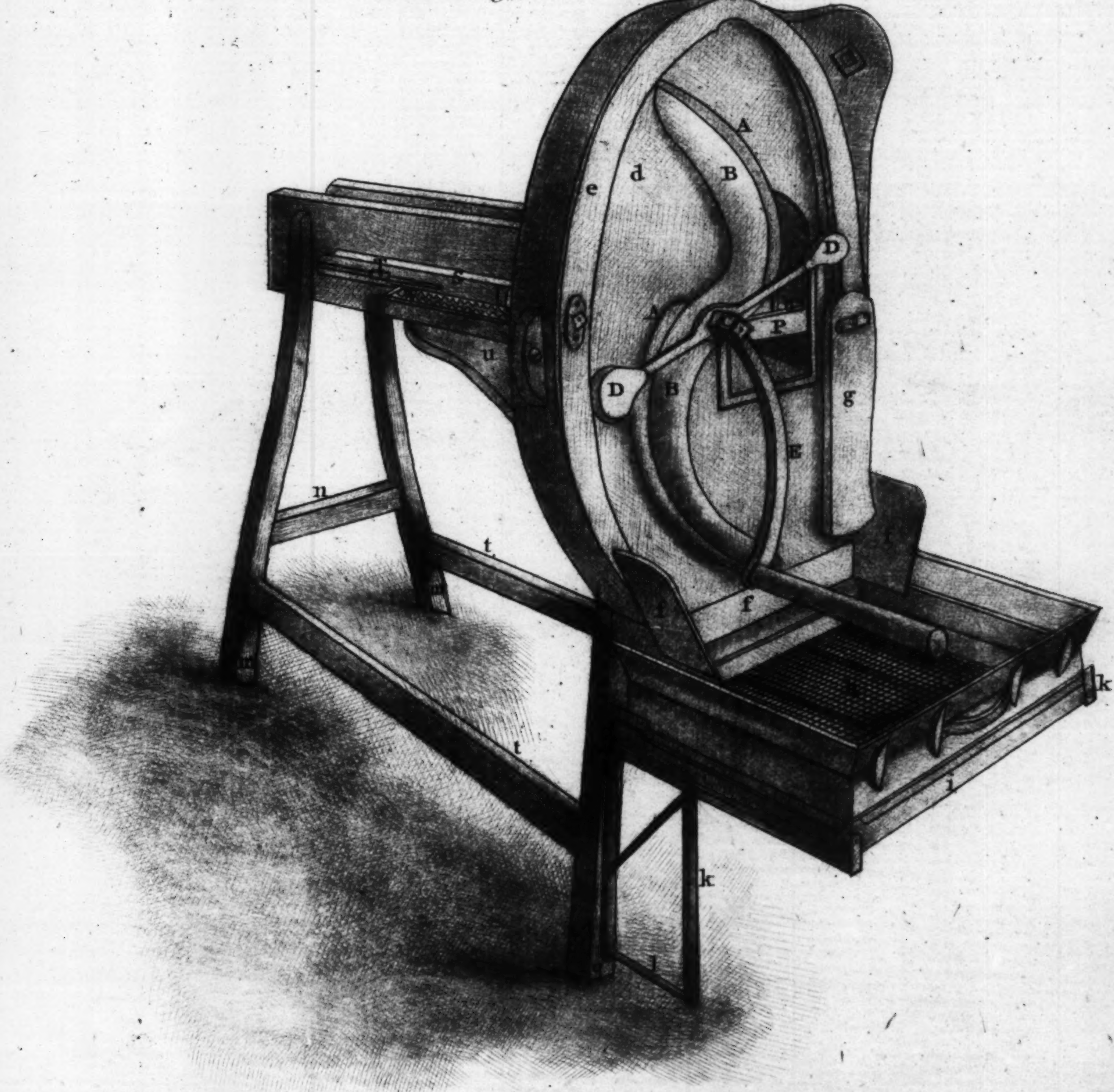
A Perspective View of Mr. Smiths Machine for cutting Straw &c.
taken from the Front.

Plate 1. Fig. 1.



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F, The Drift, or Lever. See Plate 2, Fig. 2.

G, The triangular Tumbler. See Plates 2 and 3.

H, The Tumbler, with two Arms. See Plate 2.

I, The under Lever, actuated by the Tumbler H: its extreme length is one foot five inches and an eighth from the center pin, on which it turns, to its inner end; two inches and ſeven twelfths broad, and one inch and three fourths thick: the under edge of the inner end of this Lever is plated with iron. See Plates 2 and 3.

K, The iron Lifting-rod, one foot and one inch long, one inch and three fourths broad, and one fourth of an inch thick: by this Rod, the Levers I and K are connected to each other, having a mortiſe and center-pin two inches from their inner ends, with four holes in its upper end, whereby the Preſſer-block is raiſed or depreſſed, according to the thickneſs of ſtraw to be cut. See Plate 2.

L, The upper Lever: its length, from the center-pin of the iron Rod K to the center-pin, on which it acts, is one foot nine inches and one fourth; its extreme breadth is three inches, and one inch and ſeven eighths thick. See Plate 2.

M, The iron Lifting-rod, by which the preſſer and weight are actuated: this Rod is one foot one inch and a half long; its extreme breadth one inch and a half, and its thickneſs five twelfths of an inch: the upper end of the Rod has ſix holes; and, paſſing through a mortiſe in the upper Lever, nine inches and three fourths diſtant from the center-pin, on which it turns, is faſtened thereto with an iron Bolt. See Plate 2.

N, An iron Frame, whoſe ſide arms are one foot and ſeven inches long, one inch and a half broad, and one fourth of an inch thick: the diſtance from Arm to Arm is nine inches and a half: the upper croſs bar of this Frame has a mortiſe through the middle of it, for the right M to paſs through it. See Plate 2.

O, An iron Brace, nine inches and a half long, an inch and a half broad, and one fourth of an inch thick; faſtened on the upper ſurface of the Preſſer with three iron ſcrew-bolts and nuts: the under end of the Lifting-rod M is faſtened to the under ſurface of this Brace with a ſcrew and nut. See Plate 3.

P, The Preſſer, is nine long, five inches and a half broad, and its thickneſs from the fore edge to the middle two inches and an eighth; and from the middle to its back edge it gradually diminiſhes on its under ſurface to half an inch thick. See Plate 3.

Q, The Guide, or Directing-board, two feet three inches long, nine and a half broad, and three fourths of an inch thick, having ſeven perforated grooves or mortiſes, one foot nine inches and one fourth long, and half an inch broad, to admit the ſeven taper tines of the comb to paſs through the ſtraw, and carry it forward. See Plate 3.

R, A Lead Weight, one foot and one inch long, and three inches and one fourth ſquare; faſtened to the under ends of the Arms of the Preſſer, by means of an iron bolt and two ſtaples. See Plate 2.

S, The horizontal Sliding-ſhaft, made of wood: it is three feet three inches and three fourths long, and two inches and three fourths ſquare; on the fore end and upper ſurface of this Shaft is fixed a Bracket, ten inches long, five inches and a half broad, and an inch and a half thick, to which the comb is fixed with wood-ſcrews and an iron frame, in the ſhape of a half ſtaple: in the ſide of the ſhaft, one foot and ſeven inches diſtant from its fore end, is a mortiſe, one foot ſeven inches long, and half an inch broad. See Plates 2 and 3.

T, An iron Bolt, three inches long, and three eighths of an inch thick: this Bolt is faſtened to the ſide of the Trough, three feet ſeven inches and a half diſtant from the back ſide of the circular Fence-board; and, paſſing through the mortiſe in the Sliding-ſhaft, ſerves to guide the Shaft in its proper direction, having a ſcrew, nut, and waſhee on its outer end, to keep the Shaft from coming off.

U, An iron Arm, three inches and ſeven twelfths long from its ſhoulder at the Plate, to which it is rivetted, to its outer end: this Arm forms a Socket, one inch and an eighth diameter, outſide meaſure, to receive the back ſpindle of the axis C: the Plate of the Arm is let in fluſh with the ſide of the Trough, and is faſtened thereto with wood-ſcrews. See Plates 2 and 3.

W, W, Two iron Racks, each two feet long, and an inch and one fourth broad, and three eighths of an inch thick: theſe Racks are faſtened together, at the diſtance of an inch and four twelfths from each other, by an iron Arm at each end: the inner edges of theſe Racks are cut into diagonal teeth, to fit the worm, or ſpiral ſcrew X: the inner Rack is let in fluſh with the under ſide of the Sliding-ſhaft S, as far back as the teeth, and is faſtened thereto with wood-ſcrews.

X, The Worm, or ſpiral Screw, two inches long, and an inch and a half diameter: as this Worm revolves, it brings forward the rack, ſliding-ſhaft, comb, and ſtraw.

Y, An iron Plate, in the form of a half ſtaple, as before mentioned: its upper Arm is one foot long, an inch and a half broad, and one fourth of an inch thick, and is faſtened to the fore ſide of the comb with wood-ſcrews: the perpendicular arm of this Plate is ſcrewed to the fore end of the Bracket and Sliding-ſhaft S: its under end is rounded off to three eighths of an inch diameter.

Z, An iron Brace, eight inches and three fourths long, and three eighths of an inch diameter, flatted at each end, and faſtened with wood-ſcrews to the Bracket and the back ſide of the comb. See Plate 3.

a, An iron Arm, or Drift, one foot four inches long, one foot two inches broad, and one fourth of an inch thick: the fore end of this Arm is rounded off ſix inches in length to three eighths of an inch thick; the back end of it has a wooden handle on it: this Drift is faſtened in a mortiſe a-croſs the fore end of a Sliding-bar, which is three feet long, two inches and a half broad, and two inches thick, and ſlides in an aperture in the bottom of the Trough.

b, The Sliding.board, on which the ſtraw is put, and gradually brought forward to be cut: this Board is five feet eleven inches long, and one fourth of an inch thick: it is laid on the bottom of the Trough, and faſtened with wood-ſcrews to the Sliding-board: the under end of the Arm Y bearing againſt the fore end of the Drift a, the bar and board are brought forward as the Rack, &c. advances. See Plates 2 and 3.

c, c, The

c, c, The ſides of the Trough, ſix feet and one inch long, eleven inches broad, and three fourths of an inch thick: in the fore ends of the ſides, cloſe behind the circular Fence-board, are cut two notches, with mortiſes through the bottom of the Trough, through which the ſide arms of the Preſſer paſs, to ſupport the Lead-weight R.

d, The Fence-board, two feet and ten inches high, three feet three inches broad, and an inch and a half thick, fixed againſt the fore end frame of the Trough.

e, The concentrick Rim, two feet ſeven inches diameter, two inches broad, and forms a groove three fourths of an inch deep, to guard the point of the knife, to prevent it from hurting the perſon that works the machine.

f, f, f, Three Fence-boards, fixed in a ſlanting poſition, to direct the cut ſtraw into the ſieve.

g, A Guide-board, one foot two inches long, five inches and a half broad, and one fourth of an inch thick: it is faſtened with a ſcrew to the concentrick Rim e, to prevent the cut ſtraw from ſcattering over the top of the ſieve.

h, The Sieve, two feet ſeven inches long, one foot and two inches broad, and four inches deep.

i, A wooden Frame, two feet ſeven inches long, one foot two inches broad, inſide meaſure: the depth of this Frame is two inches and a half, and three fourths of an inch thick; through each end of this Frame is an iron bolt, one foot five inches long, and one fourth of an inch thick, with a ſcrew and nut at their ends. Note. The Sieve h is placed in this Frame.

k, k, The iron Brackets, which ſupport and give motion to the Frame i: theſe Brackets are one foot four inches long, one inch broad, and one fourth of an inch thick: the fore ends of the Brackets turn up perpendicular two inches, to receive the fore ends of the Bolts, on which the Frame acts: the back arms of the Brackets are eleven inches long, one inch and an eighth broad, and four twelfths of an inch thick: the fore arm of it is nine inches and one fourth long, an inch broad, and one fourth of an inch thick: the under end of each arm forms a collar for the Brackets to turn on.

l, l, Two iron Bolts, or Spindles, on which the Brackets turn: theſe Bolts are nine inches and three fourths long from their fore ends to the ſhoulders againſt which the Brackets bear, having ſhanks behind the ſaid ſhoulders, which are inſerted through the fore legs of the Frame three inches high from their under ends, and are faſtened thereto with ſcrews and nuts.

m, m, The hind legs of the Frame, on which the Trough bears, are three feet three inches long, and their extreme breadth and thickneſs two inches: the under ends of the hind legs are two feet aſunder; their upper ends are faſtened to the ſide of the Trough with bolts, ſcrews, and nuts.

n, A croſs Rail, or Brace, one foot eight inches long from ſhoulder to ſhoulder of its tenons, two inches and a half broad, and two thick: this Rail is mortiſed into the hind legs, one foot high from their under ends.

o, The upper croſs Rail, on which the back end of the Trough bears: it is one foot long from ſhoulder to ſhoulder of its tenons, and two inches ſquare, mortiſed into the hind legs two feet four inches and one fourth high from their under ends to its upper ſurface.

p, The fore Leg, at the right ſide of the Trough, is faſtened thereto with a bolt, ſcrew, and nut, and to the Fence-board with a ſtrong wood-ſcrew.

q, The fore Leg, at the left ſide of the Trough, is two feet ten inches long, three inches broad, and two thick.

r, The under croſs Rail, or Brace of the fore Legs, two feet two inches and a half long from ſhoulder to ſhoulder of its tenons, three inches and a half broad, and one inch and a half thick. See Plate 2.

s, The upper croſs Rail of the fore Legs, one foot eight inches long from ſhoulder to ſhoulder of its tenons, three inches and three fourths broad, and an inch and a half thick: this Rail is mortiſed into the fore Legs two feet four inches and one fourth high from their under ends, and its upper ſurface, on which the fore end of the Trough bears: to this Rail the Fence-board is alſo fixed with ſtrong wood-ſcrews.

t, t, The two ſide Rails, five feet three inches long from ſhoulder to ſhoulder of their tenons, three inches broad, and two inches thick: theſe Rails are mortiſed into the fore and hind Legs, ſix inches high from their under ends.

u, A ſide Board, or Brace, three feet nine inches long: its extreme breadth eight inches, and one inch thick: the fore end of this Brace is fixed to the back ſide of the Fence-board, and its back end is ſcrewed to the bottom of the Trough. See Plate 3.

A Perſpective View of the MACHINE *from the Back End.*

PLATE II. FIG. 2.

The iron Axis.

F, The Drift, or Lever.

G, The triangular Tumbler.

H, The Tumbler, with two Arms, by which the Lever I is liſted: the Arms of this Tumbler from point to point are ſix inches and a half; the Arms are three fourths of an inch broad, and three eighths of an inch thick, and are fixed on the Axis C, between the triangular Tumbler G and the Fence-board d.

I, The under Lever.

K, The iron Rod, which connects the under Lever I to the upper Lever L.

L, The upper Lever.

M, The iron Lifting-rod, by which the Preſſer and Lead-weight are actuated.

N, The Preſſer-frame.

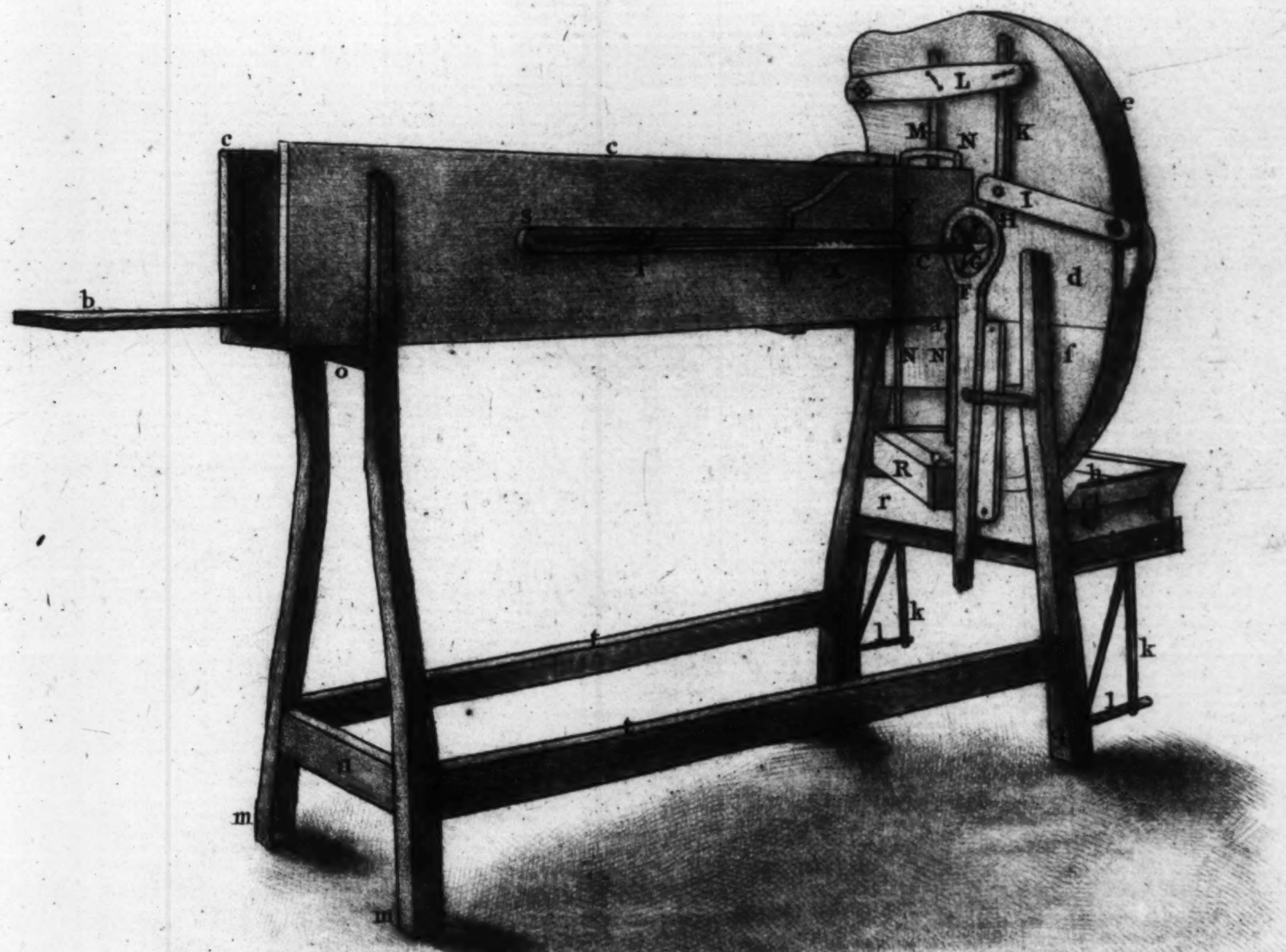
R, The Lead-weight, by which the ſtraw is preſſed, while the knife is cutting it.

S, The horizontal Sliding-ſhaft, to which the Rack is fixed.

T, The

Perspective View of Mr. Smith's Machine for Cutting Straw &c.
taken from the Back-end.

Plate 2. Fig. 2.



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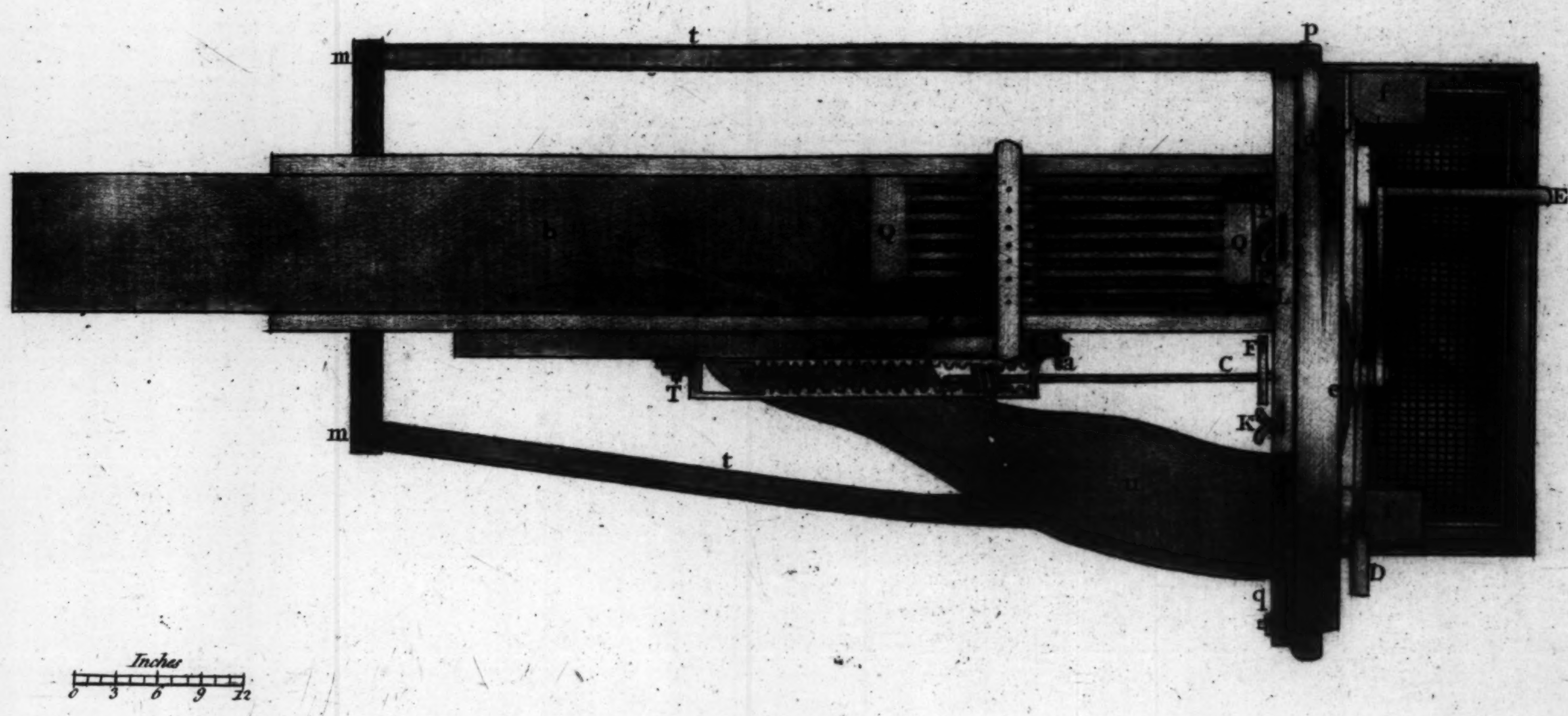
Plan of Mr. Smiths Machine for cutting Straw &c.

Plate 3. Fig. 3.



T, The iron Bolt, that ſupports the back end of the Sliding-ſhaft S.

U, The iron Arm, or Collar, that ſupports the back end of the Axis C.

X, The Worm, or ſpiral Screw.

Y, The iron Brace, that ſtrengthens the Comb, whoſe under end, bearing againſt the fore end of the Drift a, brings forward the Sliding-bar and Sliding-board, &c.

a, The fore end of the Drift, deſcribed in Plate 1.

b, The Sliding-board.

c, c, The ſides of the Trough.

d, The Fence-board.

e, The concentric Rim.

h, The Sieve.

i, The Wood-frame, that holds the Sive.

k, k, The Brackets, by which the Frame and Sieve are actuated.

l, l, The iron Bolts, or Spindles, on which the Brackets turn.

m, m, The hind Legs.

n, The under croſs Rail of the hind Legs.

o, The top Rail of the hind Legs.

p, The fore Leg, at the right ſide of the Trough.

q, The fore Leg, at the left ſide of the Trough.

r, The under croſs Rail of the fore Legs.

ſ, The upper croſs Rail of the fore Legs.

t, t, The ſide Rails, which brace the fore and hind Legs together.

PLATE III. FIG. 3.

A Plan of the MACHINE.

C, The axis of the Knife, Tumblers, Worm, &c.

D, The Fly.

E, The Winch.

F, The Lever, or Drift, by which the Sieve is put in motion.

I, The under Lever, which is actuated by the Tumbler H.

K, The iron Rod, by which the Lever I, and the Lever L, are connected.

L, The upper Lever.

O, The iron Brace. Note, only part of it can be ſeen, being under the Lever L.

P, The Preſſer-board.

Q, The Guide-board.

S, The horizontal Sliding-ſhaft.

T, The iron Bolt, that ſupports the back end of the Sliding-ſhaft.

U, The iron Arm, or Collar, that ſupports the back Spindle of the iron Axis C.

W, The iron Racks.

X, The Worm, or ſpiral Screw.

Z,	The iron Brace, that is ſcrewed to the Comb and Bracket.
a,	The Drift, or Arm, by which the Sliding-board b is brought forward and puſhed back.
b,	The Sliding-board.
c, c,	The ſides of the Trough.
d,	The Fence-board.
e,	The concentric Rim.
f, f,	Two of the Fence-boards, to direct the cut ſtraw into the Sieve. See Plate 1.
h,	The Sieve.
m, m,	The two hind Legs.
p,	The fore Leg, fixed to the right ſide of the Trough.
q,	The fore Leg, at the left ſide of the Trough.
t, t,	The ſide Rails.
u,	The ſide Board, or Brace.

This Machine was tried in preſence of the joint Committee of Agriculture and Mechanics, when a truſs of ſtraw, weighing thirty-four pounds, was cut by this Machine in forty-ſeven Minutes and three fourths, yielding four buſhels and a peck of chaff.

The Committee were of opinion, that the inventor was deſerving the premium offered, being Twenty Pounds, to which the Society agreed, *April* 3, 1774.

C H A P. X.

A Deſcription of Mr. BLANCHARD's DRILL-PLOUGH.

PLATE I. FIG. 1.

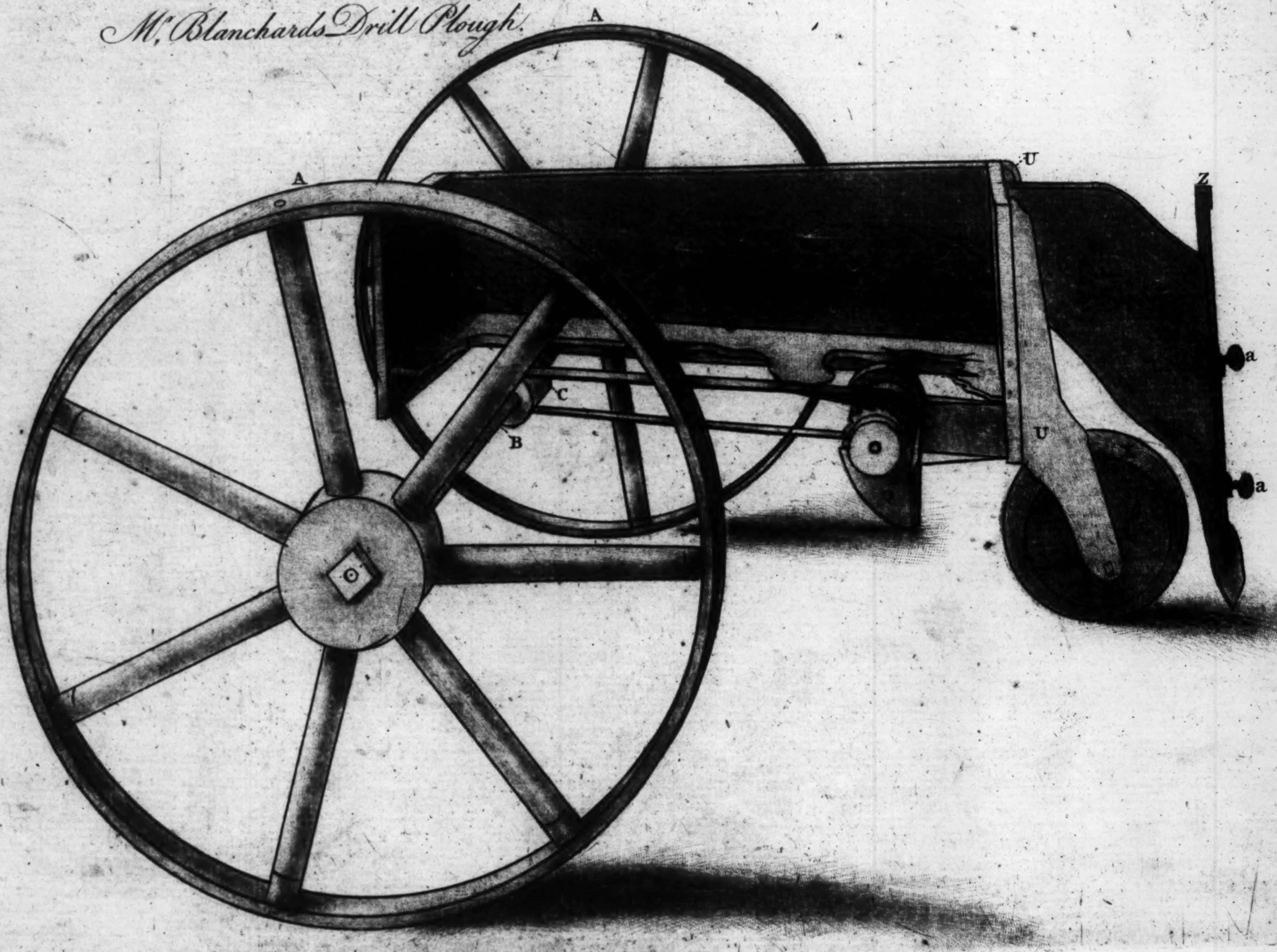
A, A, THE hind Wheels, one foot nine inches diameter: their iron rims are one inch and one fourth broad, and one fourth of an inch thick: the naves of the Wheels are five inches long, and five inches diameter, having an iron ferrel on each ſide.

B, The iron Axis, whoſe extreme length is three feet four inches and a half, and ſeven eighths of an inch ſquare: the Wheels are driven tight on the ends of this Axis, and faſtened thereto with ſcrews and nuts on their outſides, and iron pins on their inſides: the middle of the Axis is made round, about a foot in length, which part ſerves as ſpindles for it to revolve on.

C, A wooden Roller, two inches and a half long, and two inches diameter, with an iron ferrel on each end, and three fourths of an inch broad: this Roller is fixed tight on the iron Axis B.

D, A piece of Wood, two feet long, four inches and one fourth broad, and two inches thick, nailed to the ſide and bottom of the reſervoir, or Seed-box. See Plate 2, Fig. 2.

Mr. Blanchards Drill Plough.



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Mr. Blanchards Drill-plough, Plate 2d.

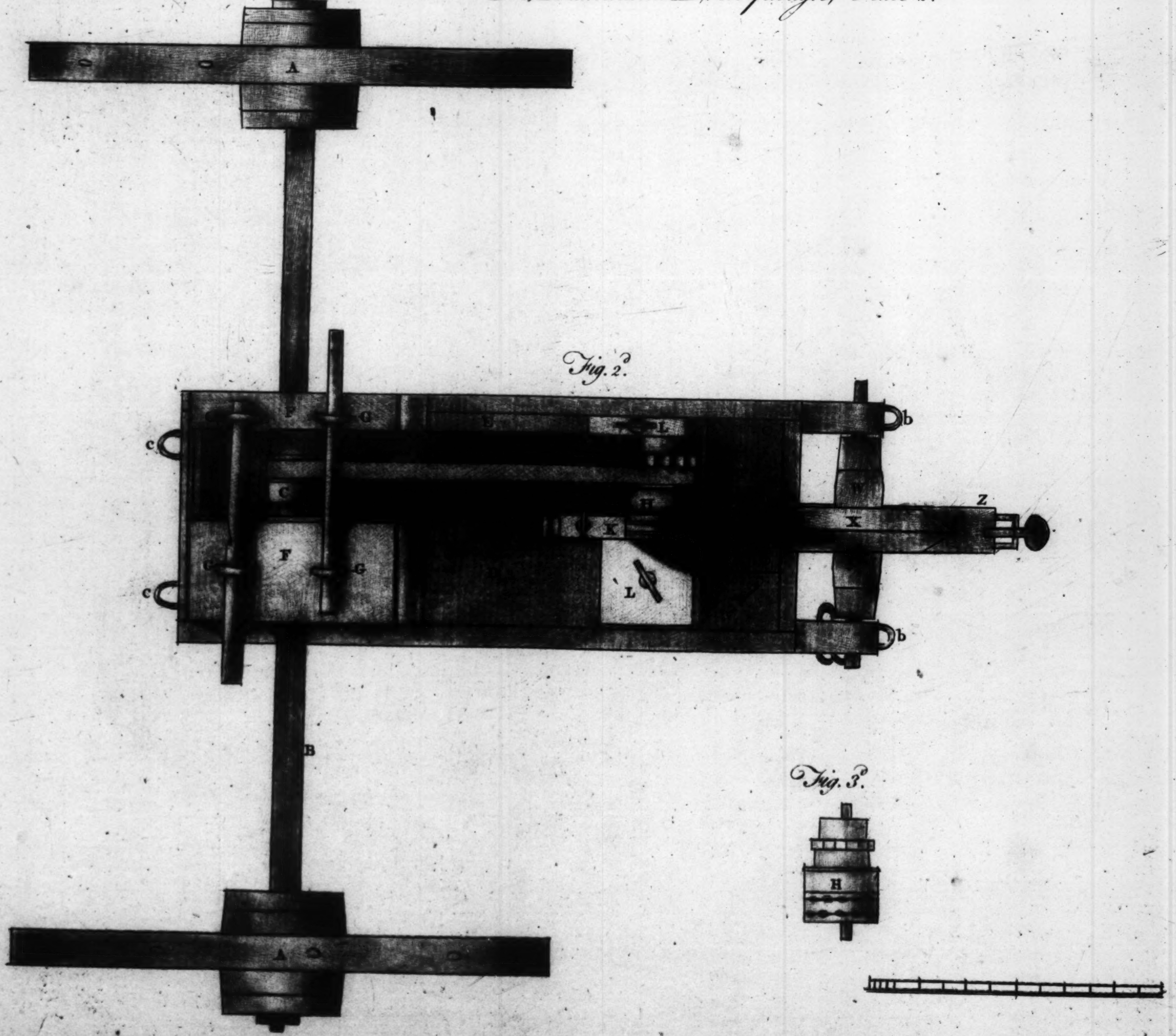

Fig. 2d

Fig. 3d

E, Another piece of Wood, two feet long, one broad, and two inches thick, nailed to the bottom and the other ſide of the reſervoir.

F, F, Two Brackets, ten inches and one fourth long; one of them four inches and one fourth broad, and the other one inch and three fourths broad, and both of them one inch and one fourth thick, having two mortiſes in each for the four Staples to paſs through, and by which they are faſtened with two Trundles to the bottom of the reſervoir, and with the pieces of Wood D and E, form a ſocket for the axis to turn on. See Plate 2, Fig. 2.

G, G, G, G, Four Staples, that faſten the Brackets F, F, to the pieces of Wood D and E. See Fig. 2.

H, The Seed-barrel, which regulates the delivery of the ſeed out of the reſervoir, or Seed-box, is three inches and a half long, and is divided into three parts, viz, 1ſt, the part that delivers the grain, which is two inches and three fourths diameter, and one inch and ſeven eighths long; is covered with a braſs rim, having two grooves, to receive two braſs triggers, and has 31 ſockets on its circumference. 2d, the part by which it is connected to the roller on the axis of the hind wheel, by means of a leather ſtrap and buckle, is two inches and three eighths diameter, and three fourths of an inch long: the third part has an iron rim, which forms a ratchet-wheel, two inches and ſeven eighths diameter, and an inch long. See Plate 2, Fig. 2 and 3, and Plate 3, Fig. 5.

I, An iron Catch, fixed to the bottom of the Seed-box, the fore end of which falls into the teeth of the ratchet, to prevent the barrel from turning backwards. See Plate 2, Fig. 2, and Plate 3, Fig. 5.

K, A Bracket, five inches long; its extreme breadth is two inches and a half, and an inch thick: in the fore end of this Bracket are fixed the two triggers, which act in the grooves of the Seed-barrel, to force out the grain, if it ſhould ſtick in the ſockets. See Fig. 8.

L, L, The two Brackets, that cover the ſpindles of the Seed-barrel.

M, A braſs Plate, three inches and an eighth long, an inch and a half broad, and three ſixteenths of an inch thick, let in even with the under ſurface of the piece of Wood D, to receive the iron Sliders N, N, and their ſpring. See Plate 3, Fig. 5.

N, N, Two iron Sliders, one inch and five eighths long, each half an inch broad, and an eighth thick; their outer ends are bent downward three eighths of an inch for the ſpring O to bear againſt: they are half an inch broad, having a mortiſe in the middle of them, through which paſs two iron ſcrews, to keep them to their places. See Plate 3, Fig. 5.

O, The Spring, bearing againſt the fore ends of the Sliders aforeſaid, to preſs them againſt the Seed-barrel, to prevent any ſeed from falling out but what is contained in its ſockets.

P, A tin Plate, ſix inches and a half long, and three inches and a half broad, faſtened with wood-ſcrews over the Sliders, and Springs to keep the dirt or wet from them. See Plate 2, Fig. 2.

Q, The Spout, that conveys the ſeeds from the barrel to the furrow: this Spout, made of thin plate iron, is three inches and a half long: it is fixed with wood-ſcrews againſt the inſide of the Bracket, that ſupports the pivots of the barrel,

rel, fixed on the piece of Wood D: the other ſide of the Spout is cut to embrace the under part of the Seed-barrel, to prevent the ſeed from ſcattering.

R, A Mortiſe, cut through the bottom of the reſervoir, three inches and a half long, and an inch and an eighth broad: directly over the Seed-barrel, at each end of this Mortiſe, is fixed a piece of braſs, which, having four wires, forms a Grate, or Screen, to prevent any thing bigger than the grain to be ſown from falling on the Seed-barrel. See Plate 3, Fig. 4.

S, A wire Spring, the ends of which are rivetted in a piece of braſs, that is ſcrewed on the bottom of the Seed-box, near the Mortiſe R: the Spring, paſſing through the Mortiſe, bears on the oppoſite ſide of the barrel, the under part of it having a double curve, to direct the grain lengthwiſe into the ſockets. See Fig. 6 and 7.

T, The Reſervoir, or Seed-box, is two feet and half an inch long; outſide meaſure nine inches and one fourth broad; eight inches deep at the fore end, and ſix inches at the back end. Note, the boards, with which this Box is made, are three fourths of an inch thick.

U, U, Two Brackets, nailed to the fore end of the Seed-box, to receive the axis of the iron Wheel X: theſe Brackets are one foot three inches and a half long, their extreme breadth is three inches, and one inch and a half thick.

W, The Axis of the iron Wheel, is ſix inches and three fourths long, and one inch and five eighths ſquare in the middle of it, having an iron ferrel on each end, and two iron Gudgeons, half an inch diameter, on which it revolves in the holes of the under ends of the Brackets U, U. See Plate 2, Fig. 2.

X, A caſt iron Wheel, ſix inches diameter, and one inch and three fourths thick, its edge forming an obtuſe angle, to make a furrow or groove in the land for the grain to drop into. See Plate 1, Fig. 1, and Plate 2.

Y, A Bracket, or Sheet, whoſe extreme length is one foot and two inches; its breadth ſix inches and three fourths; its thickneſs at the back edge two inches and one fourth, and its fore edge one inch and a half: this Bracket is nailed to the fore end of the Seed-box, having a groove in its fore edge to receive the iron Coulter, which is faſtened thereto with two iron ſtaples and ſcrews.

Z, The iron Coulter, one foot ſix inches long; its ſhank, or upper part, is half an inch by three eighths of an inch, and its under end four inches in length, and one and an eighth broad, and formed like a ſharp-pointed knife, to cut the earth in a direct line before the iron Wheel X.

a, a, The two iron Screws and Staples, that faſten the Coulter to the Sheet.

b, b, Two Staples, by which the Plough is drawn.

c, c, Two Staples, to which is hung a piece of wood.

This Plough was tried in preſence of the joint Committee of Agriculture and Mechanics.

Two hundred turns were made with this Plough on the prepared land with wheat, one drill being left open for obſerving the dropping of the ſeed.

Reſolved, it is the opinion of the Committee, that this Drill delivers the ſeed in a more regular manner than any Plough in the poſſeſſion of the Society.

Reſolved, that the candidate is entitled to the gold Medal, or Thirty Pounds, being the premium offered, to which the Society agreed, *May* 29, 1775.

END OF BOOK I.

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Plate. 3.

Fig. 4.

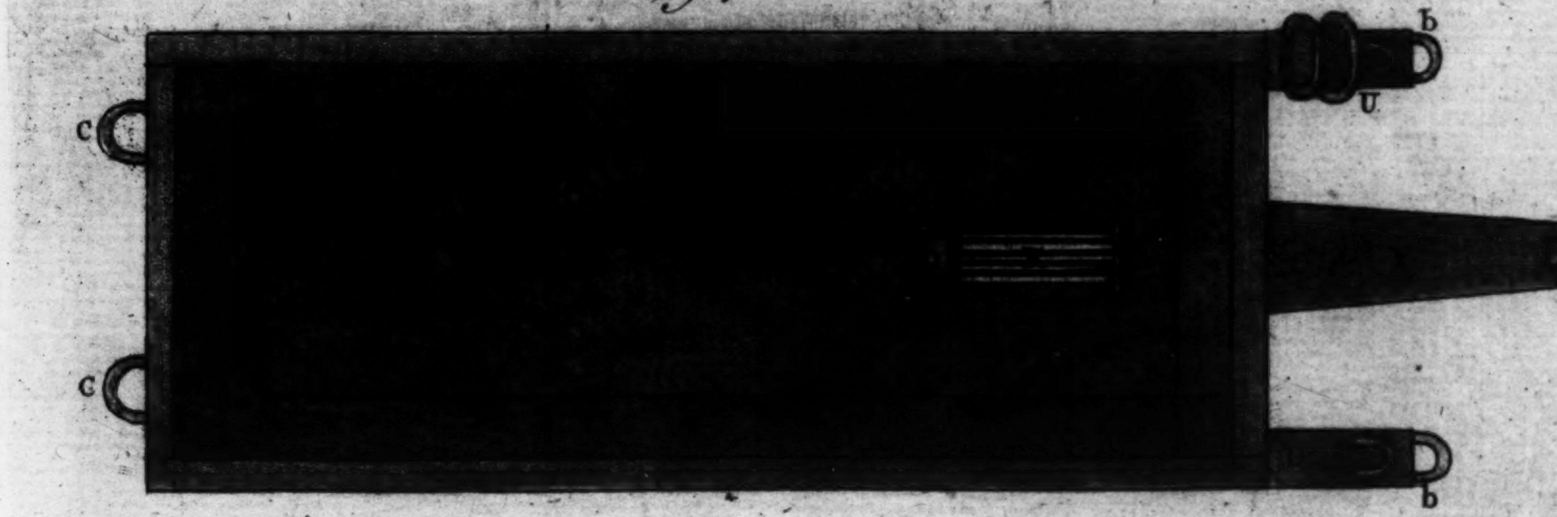
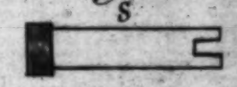


Fig. 6.



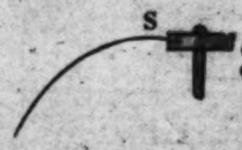


Fig. 7.

Fig. 5.

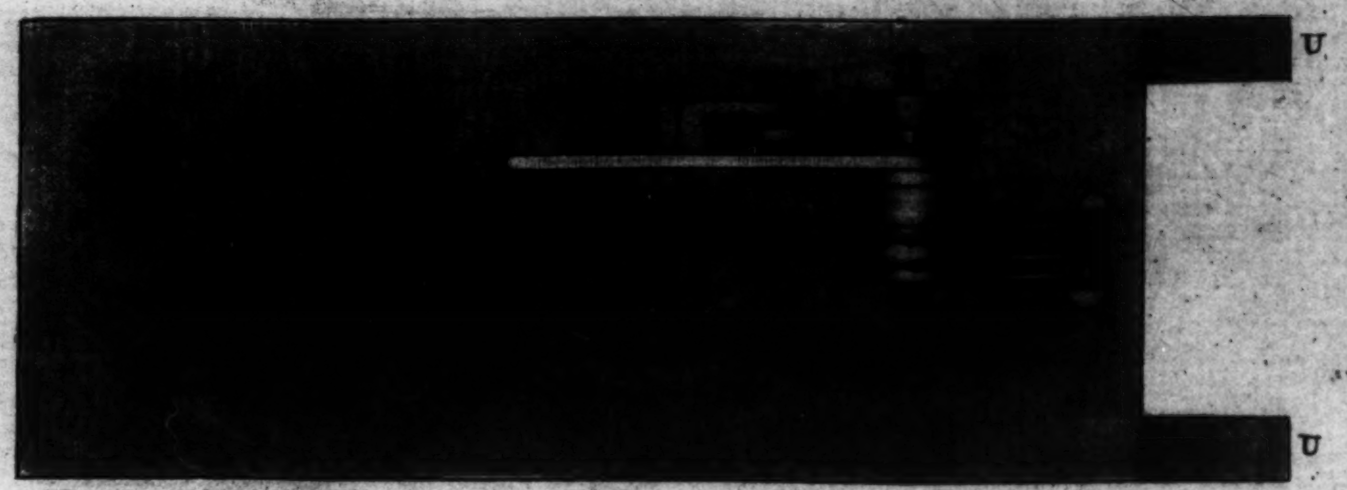
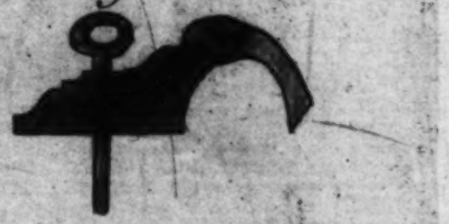
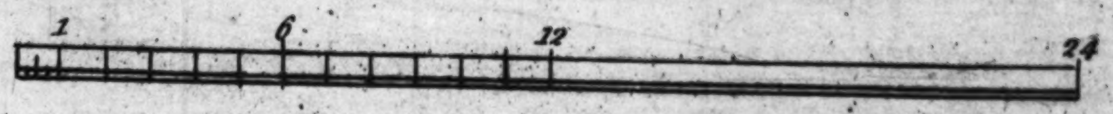


Fig. 8.





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A front View of Mr. Crager's Machine for doubling Yarn.

Plate 1. Fig. 1.

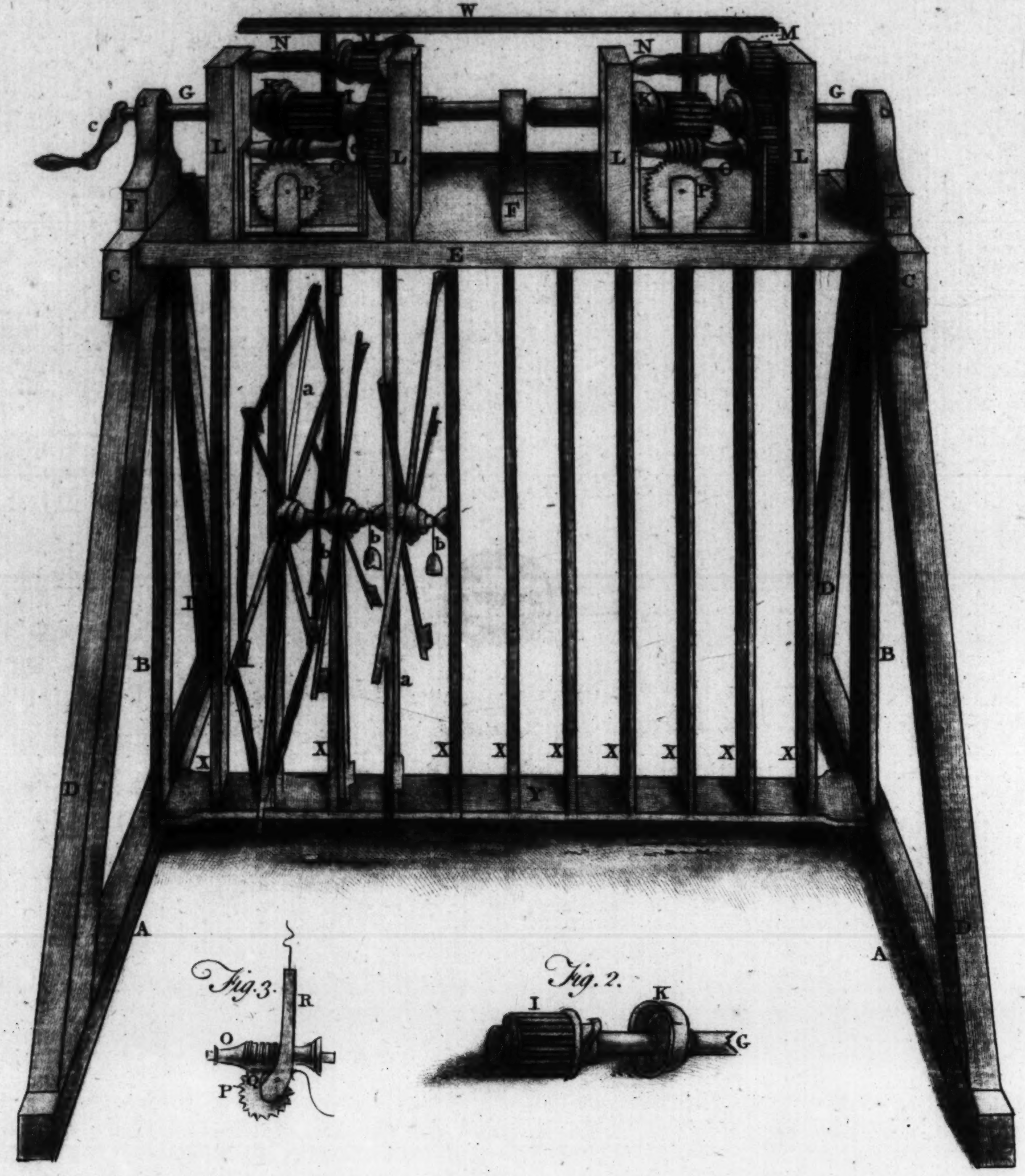

Fig. 3.

Fig. 2.

BOOK II.

MANUFACTURES.

COMPREHENDING

A Deſcription and Explanation of a Machine in the Society's Repoſitory of Manufactures, with the Repreſentation on a Copper-plate.

CHAP. I.

A Deſcription of Mr. CRAGER'S MACHINE *for doubling* YARN.

PLATE I.

A front View of the MACHINE.

A, A, THE Groundſel of the Machine, two feet nine inches long, two broad, and an inch and a half thick.

B, B, Two Styles, two feet three inches and one fourth long, excluſive of their tenons; two inches three fourths broad, and three fourths of an inch thick: theſe Styles are framed into the middle of the Sills A, and the Top-rails C.

C, C, The Top-rails, one foot one inch long, three inches and one fourth broad, and one inch and a half thick.

D, D, &c. Four Poſts, two inches broad, and an inch and a half thick, framed into the Sills and Top-rails three fourths of an inch from their outer ends.

E, The Bed of the Machine, three feet long, excluſive of its tenons; one foot broad, and an inch and one fourth thick: this Rail is framed into the Top-rails even with their upper edges.

F, F, F, Three Brackets, ſix inches long, excluſive of their tenons; their extreme breadth is five inches, and an inch and a half thick, having a mortiſe in the upper end of each of them an inch and one fourth deep, and half an inch broad, to receive the ſpindles of the Shaft G.

G, The horizontal hard wooden Axis, on which the Winch is fixed: this Axis is three feet five inches long, and half an inch diameter, and turns in the three Brackets F.

H, H, Two Wheels, ſeven inches and three fourths diameter, and ſeven eighths thick, having eight teeth on their periphery.

I, I, Two Barrels, ſix inches long, and two inches diameter, having twelve ratchet-teeth, againſt which the ſtops are lifted, when any of the threads break: on one end of theſe Barrels the Wheels H are fixed; it has a groove inſide the wheel for a band, which connects it to the perpetual ſcrew: the oppoſite ends to that, on which the wheels H are fixed, are two ſpring-catches, which bear againſt the ſtuds, on the inner ſurface of the nut K, by which the barrels and wheels are carried round, till the ſtops bear againſt the outer teeth of the barrel, in which caſe the ſpring-catch ſnaps over the teeth of the nut, and gives a ſignal of a thread's breaking.

K, K, The Nuts: theſe Nuts are four inches diameter at one end, which are turned and hollowed, to admit the ſpring-catches to turn round within them; the other end is an inch and a half diameter, and is fixed on the Axis G.

L, L, &c. Four upright Poſts, framed into the bed of the Machine: the outer Poſts are four inches and a half diſtant from the ends of the bed: the inner Poſts one foot and half an inch diſtant from it: theſe Poſts receive the pivots of the ſpindles of the bobbins.

M, M, Two Pinions, one inch and five eighths diameter, and an inch thick, each having fifteen leaves: theſe Pinions are fixed on the ſpindles of the bobbins, and are actuated by the Wheels H.

N, N, The Bobbins, put finger-tight on the ſpindles, for the yarn to be wound on: theſe Bobbins are ſix inches long, and an inch diameter, except their feet, which are two inches diameter.

O, O, Two perpetual Screws, actuated by the Barrels I, by means of two bands: theſe Screws are five inches and a half long, and an inch and a half diameter.

P, P, The Worm-wheels, three inches and a half diameter, and one fourth of an inch thick, having forty-four teeth: theſe Wheels are actuated by the Worms, or perpetual Screws O, O.

Q, Q, Two oval pieces of Wood, half an inch thick, and one inch and a half long in the oval, fixed on the ſpindle of the Worm-wheel to guide the yarn on the bobbin. See Fig. 3.

R, R, The Guide-rods: theſe Rods are four inches and a half long, two inches broad at their under ends, and half an inch at their upper ends, having a pin or ſtud in each, which bears againſt the edge of the oval pieces Q, Q. See Fig. 3.

S, S, &c. Twelve Rails, ſix inches long, two inches and a half broad, and half an inch thick, fixed on the bed in angular diviſions, their back ends tending to the Barrels I. See Plate 2, Fig. 4 and 5.

T, T, &c. Twelve Levers, ten inches long, and one fourth of an inch ſquare, turning on a center-pin, ſix inches from their outer ends, ſcrewed into the ſides of the Rails S: there is a wire hook in the outer end of each Rail and Lever for the threads to paſs through, to direct it to the wire on the Guide-ſtick; and, when either of the threads break, the outer end of that Lever drops and raiſes the wire ſtop at its inner end againſt the ratchet-teeth of the Barrel I. See Fig. 5.

U, A Board, two feet ſeven inches long, ſix inches broad, and three eighths of an inch thick, fixed on the upper edges of the Rails S.

W, A Rail, two feet ſeven inches long, half an inch broad, and three eighths thick, with its upper ſide rounded: this Rail is erected on the Board U, five inches above its upper ſurface, having two wire loops to guide the threads to the bobbins.

X, X, &c. Eleven Ribs, two feet five inches long, three inches broad, and three fourths of an inch thick, dove-tailed into the Bed E, and Brace Y, at equal diſtances.

Y, The Brace, three feet and half an inch long, excluſive of its tenons; ſix inches broad, and three fourths of an inch thick: this Brace is framed into the groundſels even with their upper edges.

a, a, &c. The Swifts, on which the ſkains of yarn are put, to be wound off: theſe Swifts conſiſt of a nut, whoſe extreme diameter is three inches, and two inches and a half long, turning on ſpindles three eighths of an inch diameter in the middle of the Ribs X: each nut has ſix arms one foot long.

b, b, &c. A leaden Weight, about three ounces hanging in a bow-ſtring on the groove part of each nut, to prevent the Swifts from over-ſhooting the thread.

FIG. 2.

G,	Part of the Axis.
I,	The Barrel and Spring-catch.
K,	The hollow Nut, in which the ſpring-catch turns.

FIG. 3.

O,	The Worm.
P,	The Worm-wheel.
Q,	The oval Director.
R,	The Guide-ſtick.

PLATE

PLATE II. FIG. 4.

A, A,	The Groundſels.
C,	The Top-rails.
D, D, &c.	The Four.
E,	The Bed of the Machine.
F, F, F,	The Brackets, that carry the Axis G.
G,	The Axis on which the Wheels H, Barrels I, and Nuts K revolve.
H, H,	The Wheels, that give motion to the Bobbins N, and Worms O.
I, I,	The Ratchet-barrels, with their ſprings.
K, K,	The hollow Nuts.
L, L, L, L,	The upright Poſts, that carry the ſpindles of the bobbins.
M, M,	The Pinions, that are fixed on the ſpindles to put them in motion.
N, N,	The Bobbins.
O, O,	The Worm-wheels, actuated by bands connected to the grooves on the Barrels H.
S, S, &c.	The Rails, to which the center-pins of the Levers T is ſcrewed.
T, T, &c.	The Levers, with their hooks.
U,	A Board, on which the Guide-rail is fixed.
W,	The Guide-rail, with its two wire loops.
a, a, &c.	The Swifts.
c,	The Winch, by which the Machine is put in motion, whoſe radius is five inches and a half.

This Machine was examined by the Committee of Manufactures, who were of opinion that this candidate was deſerving of Ten Pounds, part of the premium of Seventy-five Pounds; to which the Society agreed, *April* 17, 1765.

END OF BOOK II.

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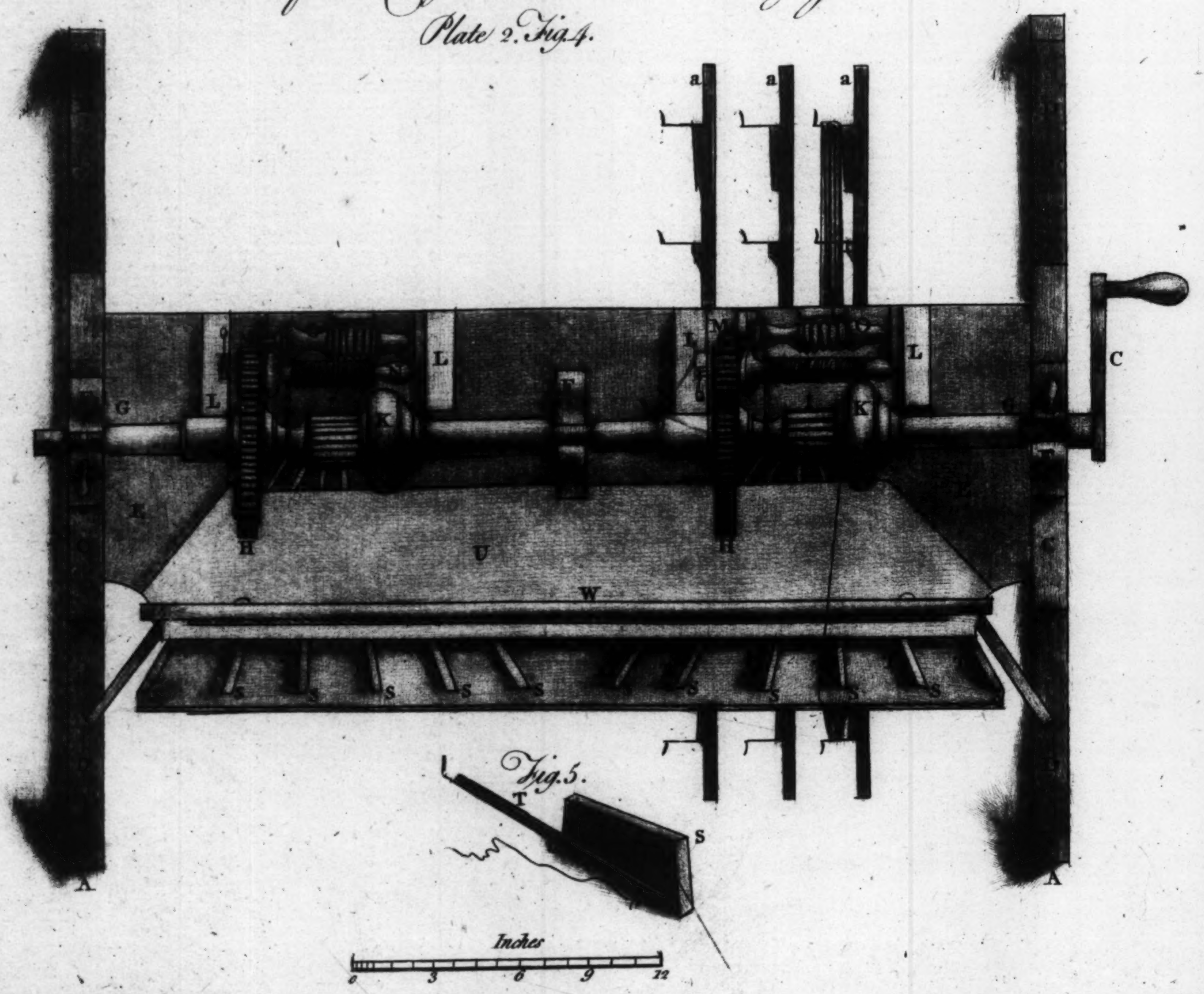
A Plan of Mr. Cragers Machine for Doubling Yarn.

Plate 2. Fig. 4.



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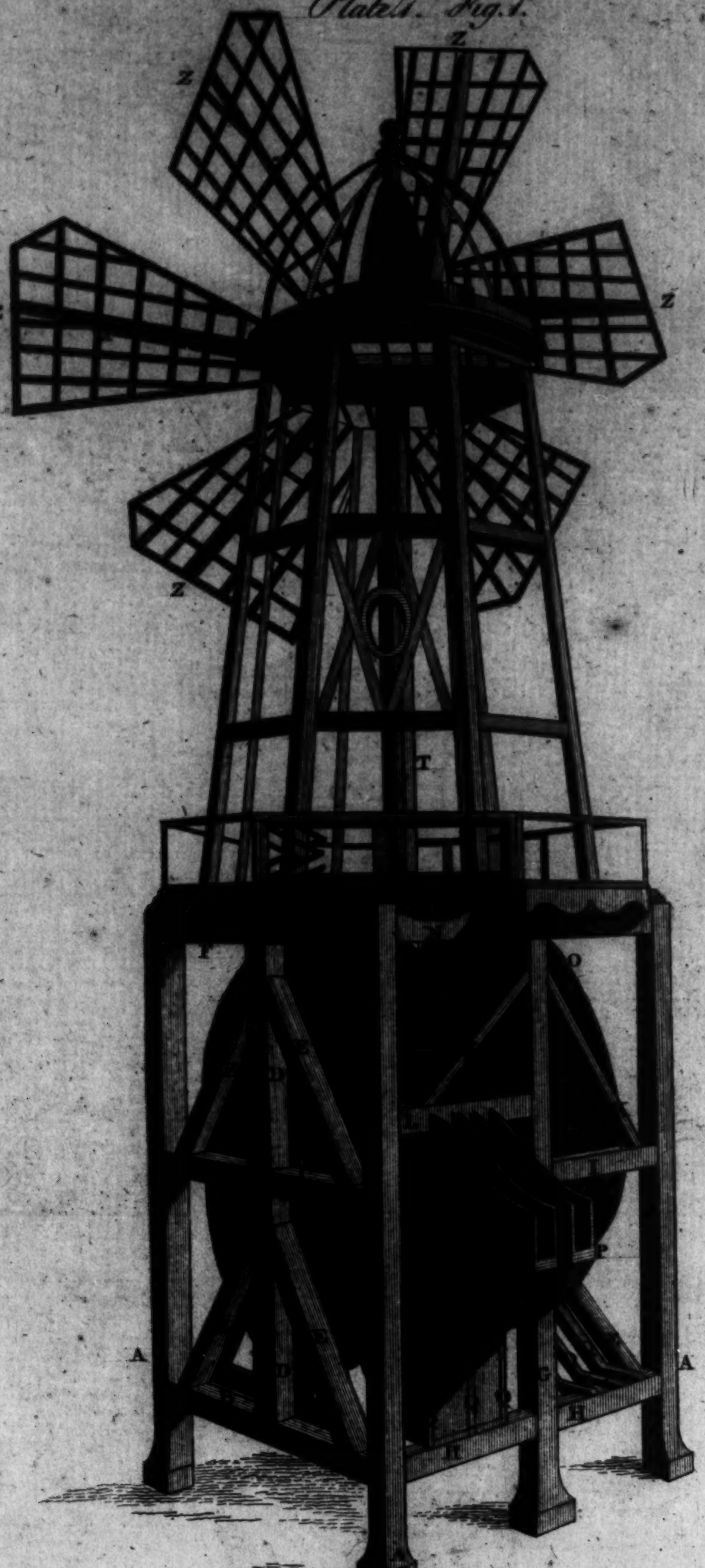
XXIV.

P.37

A description of Mr. Colliers Wind-mill for draining Fenny Lands.
raising the Water Seven Feet & Six Inches high.

Plate 1. Fig. 1.



BOOK III.

MECHANICS.

COMPREHENDING

A ſhort Account of ſuch Mills, Models, and other Machines in the Society's Repoſitory, as are not yet delineated.

CHAP. I.

A Deſcription of Mr. COLLIER'S WIND-MILL *for draining Fenny Land with four Scoop-wheels.*

PLATE I.

A Perſpective View of the MILL.

A, A, A, &c. THE principal Poſts of the under part of the Mill: theſe Poſts are twenty-four feet long, and one foot three inches ſquare.

B, B, The under Side-rails, ſixteen feet eleven inches long from ſhoulder to ſhoulder of their tenons; one foot three inches broad, and one foot thick: theſe Rails are framed into the principal Poſts A, A, two feet eight inches above their under ends. Note, only one of the Rails is ſeen in this view.

C, C, The middle Side-rails, on which the outer pivots of the Scoop-wheel-ſhafts reſt: theſe Rails are ſixteen feet eleven inches long from ſhoulder to ſhoulder of their tenons; one foot three inches broad, and one foot one inch thick, framed into the Poſts A, A, &c. eight feet three inches above the upper ſides of the Rails B, B. Note, only one of them is ſeen in this view.

D, D, &c. The middle Poſts of the ſides: theſe Poſts are eight feet four inches long from ſhoulder to ſhoulder of their tenons, and one foot three inches ſquare, framed into the under, middle, and top rails: the inner ſides of the upper Poſts are grooved to receive the outer ſpindles of the Scoop-wheels.

E, E, &c. The Braces of the middle Poſts: theſe Braces are ten feet five inches long, one foot three inches broad, and ſeven inches thick, and are ſhouldered into the Rails B and C, and the Poſts D, D.

F, F, The top Rails of the pedeſtal part of the Mill, on which the gallery bears: theſe Rails are ſixteen feet eleven inches long from ſhoulder to ſhoulder of their tenons, and the ſame breadth and thickneſs as the Rails B and C.

G, G, The middle Poſts in the end of the Mill: one of theſe Poſts is twenty-two feet and one inch long from the ſhoulder of its tenon, framed into the top end Rail: the other Poſt is twelve feet eleven inches long, and both of them the ſame breadth and thickneſs as the Poſts A.

H, H, &c. The under end Rails, eight feet eleven inches long, and the ſame breadth and thickneſs as the ſide Rails B.

I, A Rail, eight feet eleven inches long, one foot three inches broad, and one foot and one inch thick, framed into the Poſts A and G eight feet three inches above the upper ſurface of the Rail H.

K, A Brace, nine feet eleven inches long, and the ſame breadth and thickneſs as the Braces E.

L, A Rail, eight feet eleven inches long, &c. framed into the Poſts A and G ten feet and eight inches above the Rail B.

M, A Brace, eight feet and an inch long.

N, &c. The upper end Rails, the ſame dimenſions as the Rails N.

O, O, O, O, The Scoop-wheels, by which the water is raiſed: theſe Wheels are fifteen feet diameter, and one foot four inches broad on their edges, having twenty ladle-boarts, or buckets, by which the water is raiſed in the Troughs P, P, &c. to the height of the axis of the wheels.

P, P, &c. The Troughs, through which the water is raiſed by the Wheels O, O, &c. The outer ends of theſe Troughs are ſeven feet three inches long, and ſeven feet three inches deep: the inner end forms a ſegment of a circle, to embrace the ſides of the Water-wheels: their ſides are three feet broad.

Q, Q, &c. Six Frames, in the form of the Rails and Poſt B, C, D, E, to ſupport the ſhafts of the Water-wheels.

R, R, The nuts of the Scoop-wheels, one foot nine inches long, and one foot five inches ſquare, driven tight on the iron ſpindles three inches diameter.

S, S, Two vertical Crown-wheels, three feet four inches diameter, having twenty cogs in each: theſe Wheels are fixed on the iron ſpindles of the Scoop-wheels. See Plate 2.

T, The perpendicular Shaft of the Mill: this Shaft is thirty-one feet ſix inches long, one foot ſix inches diameter at its under end, and one foot two inches at its upper end, having an iron ſpindle at each end. Note, the under ſpindle turns in a beam, one foot three inches ſquare, framed into the Poſts G, G, with its upper ſurface even with the Rail I.

U, A Crown-wheel, three feet four inches diameter, having twenty cogs, fixed on the under end of the Shaft T, which gives motion to the Scoop-wheels.

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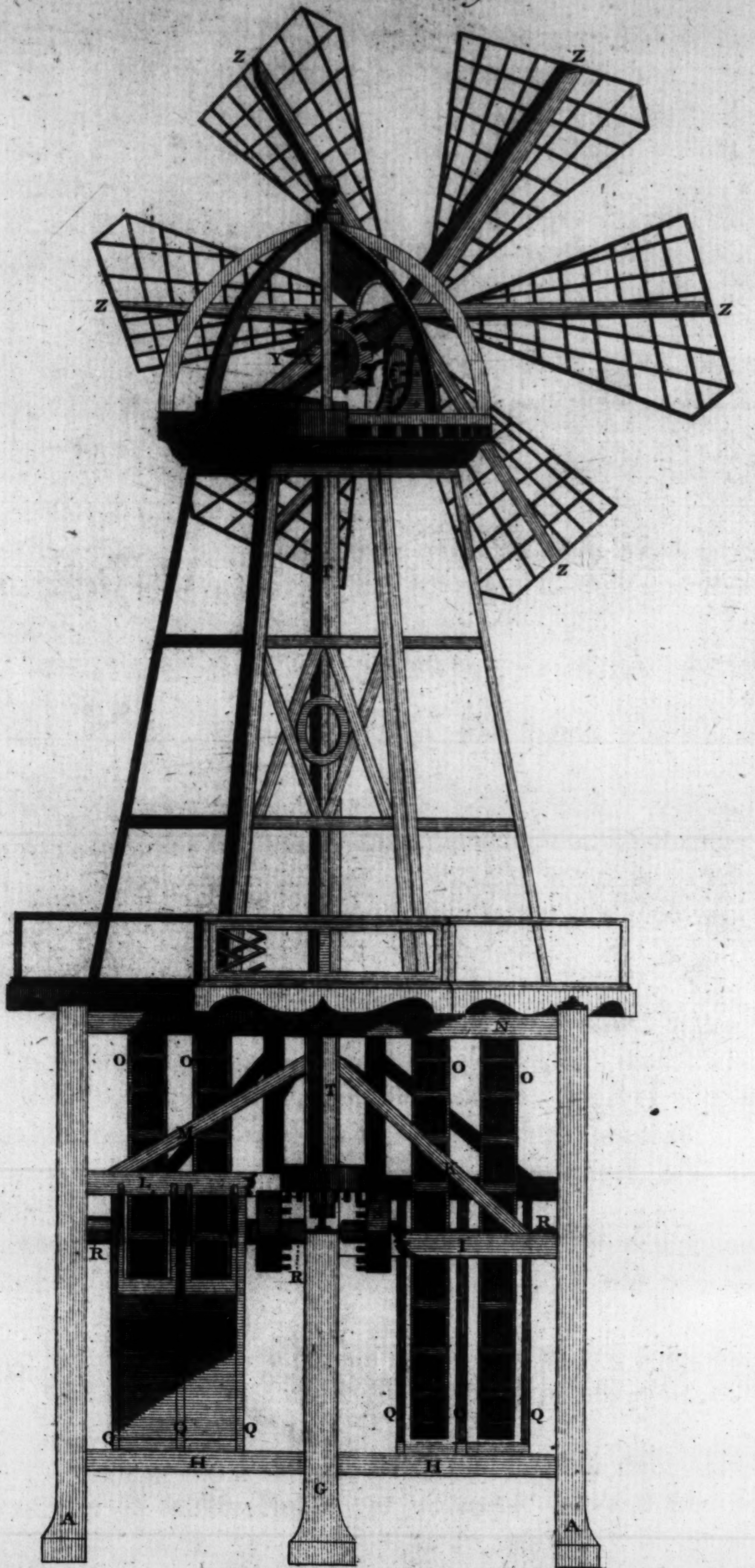
Plate 2. Fig. 2.



W, A Spur-wheel, three feet nine inches diameter, having fourteen cogs, actuated by the Spur-wheel Y, and is fixed on the upper end of the upright Shaft T. See Plate 3.

X, The Wind-ſhaft; its extreme length is twelve feet, one foot four inches diameter at its fore end, and one foot one inch at its under end, having a Spur-wheel Y, fixed on the middle of it.

Y, A Spur-wheel, three feet nine inches diameter, having fourteen cogs: this Wheel is fixed on the Wind-ſhaft, and gives motion to the Spur-wheel W, &c. See Plate 3.

Z, Z, &c. The Arms of the Sails, twelve feet ſix inches long from the ſhaft to their outer ends, eight inches broad, and five thick, into which the laths that form the angular ſails are halved: their outer ends are eight feet ſeven inches broad, and meet in a point at the inner end of each Arm.

a, a, a, Three Arms, nineteen feet ſix inches long, five inches ſquare in the middle, where they are fixed in the mortiſes in the fore end of the Wind-ſhaft; their outer ends five inches by three: the Arms of the Sails are fixed to the fore ſides of the Arms a with ſtrong ſcrew-bolts, and are ſet to an angle of forty-five degrees with the Wind-ſhaft.

All the remainder of the framing is put together in the common way of Mill-work.

PLATE II. FIG. 2.

The end Elevation of the MILL.

A, A, The principal Poſts.

G, A ſection of one of the middle Poſts.

H, H, The under end Rails.

I, A ſection of a Rail framed into the Poſts A and G.

K, A Brace, framed one end of it into the Poſt G, and its other end into the Rail I.

L, A Rail, framed into the Poſts A and G, as deſcribed in Plate 1.

M, A Brace, framed into the Rail L, and Poſt G.

N, The upper end Rail.

O, O, O, O, The Scoop-wheels, deſcribed in Plate 1.

P, P, P, P, The Troughs, which conduct the water from the Scoop-wheels to the canals.

Q, Q, Q, &c. Six Frames, that ſupport the axis of the Scoop-wheels, to prevent them from bending.

R, R, Two iron Axis's, on which are fixed four nuts of the Scoop-wheels, whoſe dimenſions are deſcribed in Plate 1.

S, S, The Crown-wheels, fixed on the axles of the Scoop-wheel.

T, The perpendicular Shaft.

U, The Crown-wheel, which gives motion to the Wheels S, S.

X, The Wind-ſhaft, ſet on the moveable Kerb to an angle of thirteen degrees with the horizon.

Y, The Spur-wheel, that turns the perpendicular Shaft.

Z, Z, &c. The Arms of the Sails.

PLATE III. FIG. 3.

The Plan of the MILL.

A, A, &c. The end Poſts.

F, F, The upper ſide Rails.

N, N, The upper end Rails.

O, O, O, O, The Scoop-wheels.

P, P, P, P, The Troughs, or Shut, that convey the water from the wheels.

Q, One of the Frames, that ſupport the axis of the Scoop-wheels.

R, One of the axles of the Scoop-wheels.

W, The Spur-wheel, fixed on the upper end of the perpendicular Shaft.

X, The Wind-ſhaft.

Z, Z, &c. The Arms of the Sails.

CHAP. II.

A Deſcription of Mr. COLLIER'S WIND-MILL *for draining Fenny-Land with a Ladle-wheel.*

PLATE I.

A Perſpective View of the MILL, *taken from the Fore Side and Back End.*

A, THE Baſe, on which the Mill is erected: this Baſe is four walls, forming a ſquare of ſeventeen feet eight inches at the bottom, and ſixteen feet ſix inches at its upper edge, outſide meaſure, and nine feet high.

B, B, B, B, The Groundſels of the Mill: theſe Sills are one foot three inches broad, and nine inches thick, forming a Frame ſixteen feet ſix inches ſquare, reſting on the Baſe A.

C, C, C, C, The four principal Poſts, nineteen feet four inches long from ſhoulder to ſhoulder of their tenons, and one foot ſquare: the under ends of theſe Poſts are mortiſed into the Sills B, &c. and their upper ends into the Frame D.

D, A Frame, five feet ſquare, outſide meaſure, the timbers of which are one foot broad, and nine inches thick, halved together, and mortiſed on the upper ends of the Poſts C, C, C, C.

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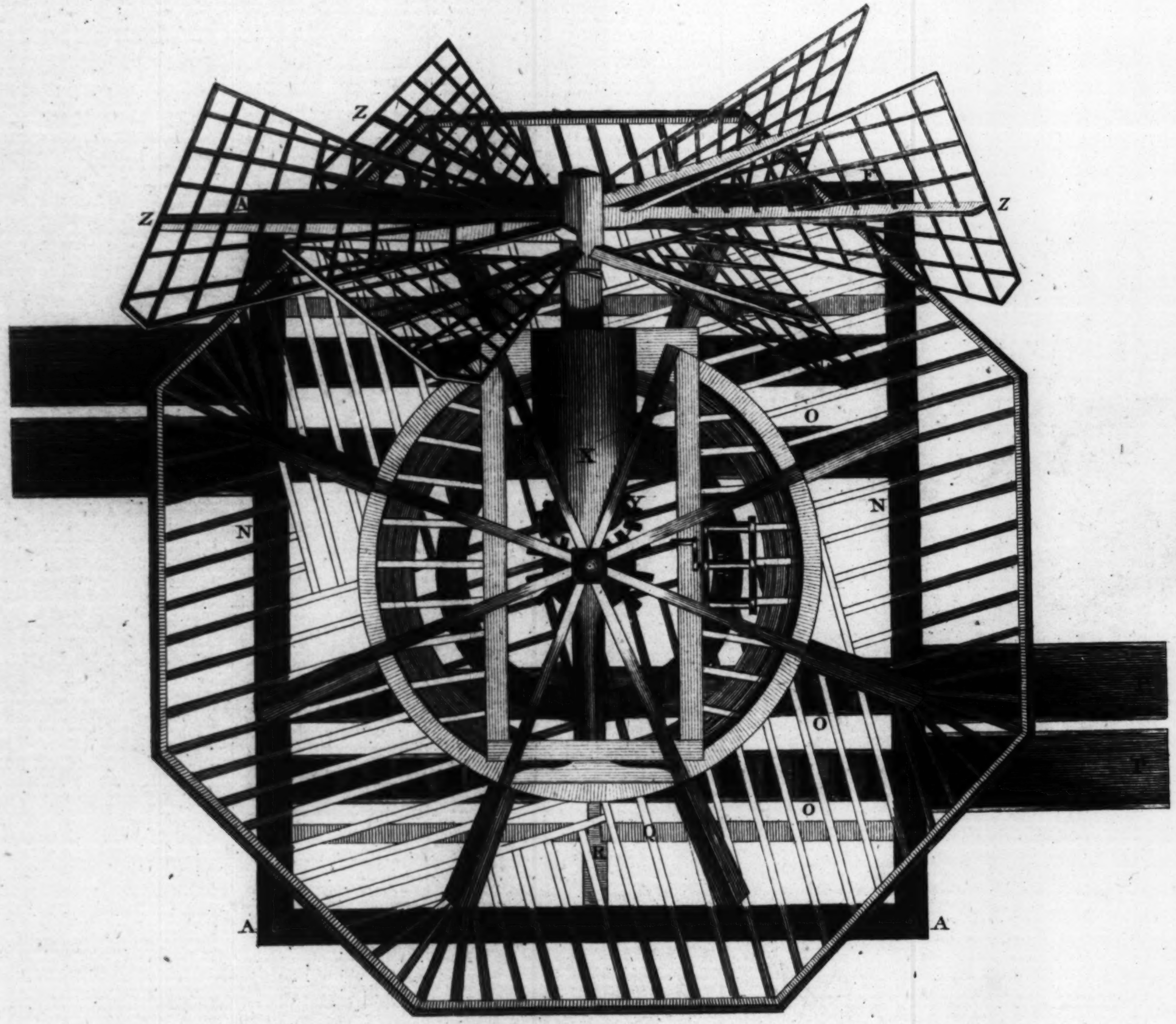
Plate 3. Fig. 3.



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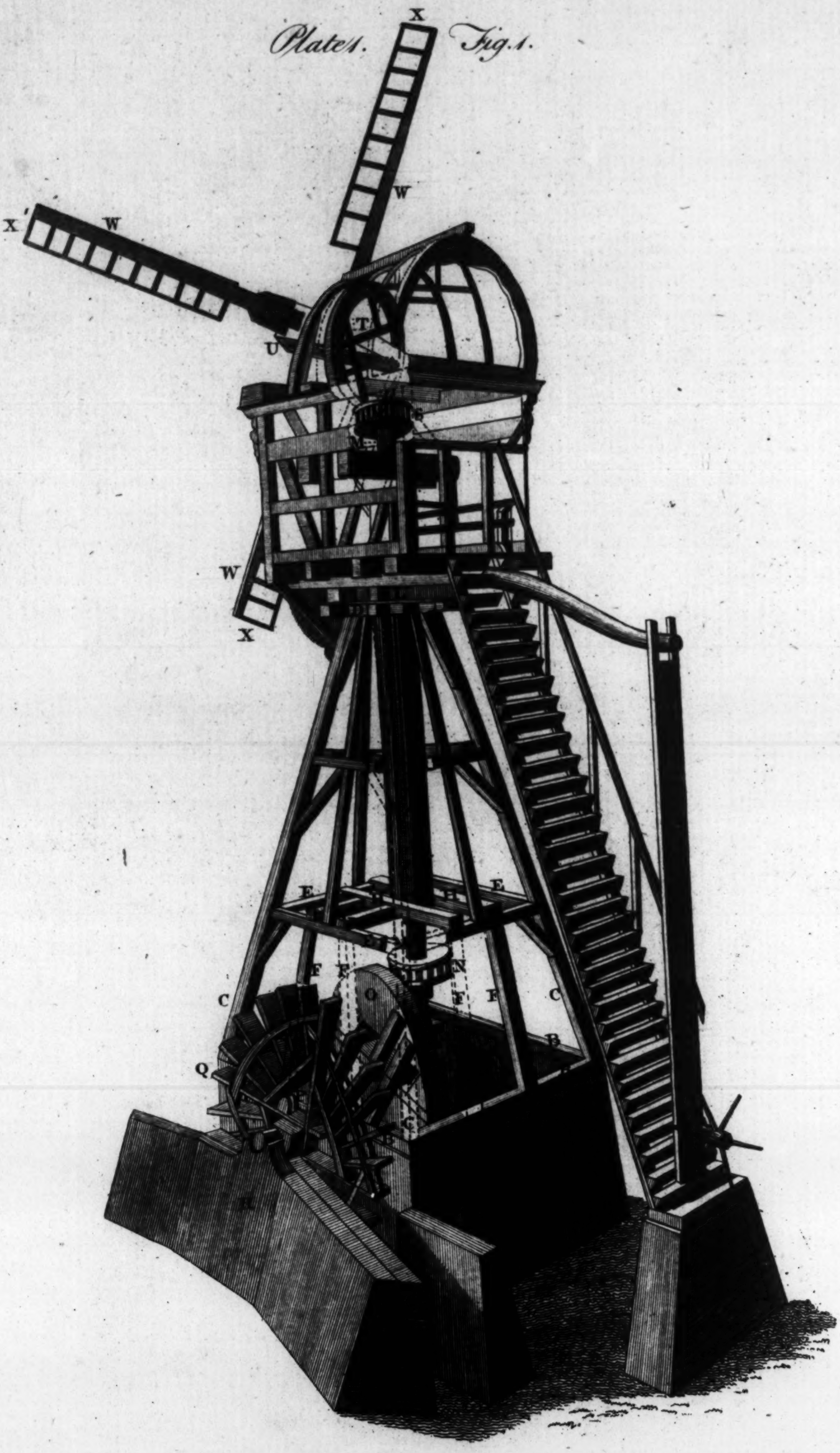

A Perspective View of the Mill from its fore side.

Plate 1. Fig. 1.

E, E, E, E, Four Side-rails, ten feet ſix inches long from ſhoulder to ſhoulder of their tenons, one foot broad, and ten inches thick, framed into the principal Poſts C, C, &c. ſix feet perpendicular above the Sills B.

F, F, F, F, &c. Eight Poſts, ſix feet four inches long from ſhoulder to ſhoulder of their tenons, and nine inches ſquare: theſe Poſts are framed into the Sills B, and Rails E.

G, G, Two Rails, twelve feet ſix inches long, one foot broad, and ten inches thick: each end of theſe Rails is notched half their depth, and reſt on the Rails E, E, one foot four inches from each other, and faſtened thereto with wooden pins.

H, H, Two Rails, the ſame dimenſions as the Rails G, G, halved into them at one foot four inches from each other, and reſt on the upper ſurface of the Rails E, E, faſtened thereto with wooden pins.

I, I, &c. The upper Rails, ſix feet four inches long from ſhoulder to ſhoulder of their tenons, one foot broad, and ten inches thick, framed into the Poſts C C C C, which carry four Rails, fixed as the Rails G, G, and H, H.

K, An octangular Trunk, or hollow Poſt: its extreme length is nineteen feet three inches: it is three feet diameter at its under end, which is fixed to the Rails G, G, and H, H, at the diſtance of ten feet ſeven inches above the Rails G: it paſſes through the Frame D, and Kerb L, to which it is properly fixed, to prevent its moving: the cavity of this Trunk is one foot three inches diameter from the upper ſurface of the Kerb: the Trunk is made round, two feet five inches in length, and two feet ten inches diameter, round which part the under frame of the head of the Mill revolves: five feet above the upper ſurface of the Kerb L: four Rails, ſix feet long, ten inches broad, and eight inches thick, are framed together, and let three inches into the Trunk, and are faſtened to it with ſtrong ſcrew-bolts, and ſupported with four Brackets, forming a bolſter for the head of the Mill to bear on: from the upper ſurface of this bolſter, the Trunk is made round, and is the upper axis on which the Mill-head turns.

L, The Kerb, being four pieces of timber, one foot broad, and nine inches thick, mortiſed together to form a Frame of five feet ſquare: it is fixed on the Frame D.

M, The perpendicular Shaft of the Mill: this Shaft is twenty-ſeven feet ſix inches long, and nine inches ſquare, turning on iron pivots: the under pivot turns in a braſs ſocket, on the upper ſurface of a ſtrong Frame, erected in the middle of the Baſe A.

N, A Wallower, three feet diameter, having ſeventeen Trundles: this Wallower is fixed on the Shaft M, ſix inches above its under end, and gives motion to the vertical Crown-wheel O.

O, A vertical Crown-wheel, eleven feet diameter, having ſixty-eight cogs: this Wheel is fixed on the inner end of the Shaft of the Scoop-wheel.

P, The Shaft of the Scoop and Crown Wheels: this Shaft is ten feet, nine inches long from ſhoulder to ſhoulder of its pivots, and is one foot two inches ſquare: its outer pivot is one foot diameter, and its inner pivot ten inches diameter.

Q, The Scoop-wheel, thirteen feet diameter, and eleven inches broad on its edge, having twenty-four Ladles, or Arms.

R, A Wall, ſix feet high, three feet thick at the bottom, and two feet at its upper ſurface, with a Bracket fixed thereon to carry the fore ſpindle of the Axis P: the inſide of this Wall and the fore ſide of the Baſe is perpendicular, and made to embrace the ſides of the Scoop-wheel from the perpendicular of its center to its fore end: the fore part of the channel forms a ſegment of a circle, riſing three feet high, and is fitted to the periphery of the Scoop-wheel, to prevent the water from running back.

S, A Wallower, three feet diameter, having ſeventeen Trundles: this Wallower is fixed on the upper end of the perpendicular Shaft M, and is turned by the Crown-wheel T.

T, A vertical Crown-wheel, ſeven feet diameter, having forty-four cogs: this Wheel is fixed on the Wind-ſhaft.

U, The Wind-ſhaft, ſixteen feet long, two feet two inches ſquare at its fore end, and its tail-end one foot four inches octangular.

W, W, Two croſs Arms, twenty-ſeven feet long, and eleven inches ſquare in the middle, their outer ends diminiſhed to ſix inches by three inches: theſe Arms are driven tight into two mortiſes in the fore end of the Wind-ſhaft U, and are faſtened thereto with brackets and ſcrew-bolts.

X, X, &c. The Sails, nine feet long, and two feet four inches broad, whoſe Arms are twelve feet long: their extreme breadth eleven inches, gradually diminiſhing to their outer ends, where they are four inches broad, and three inches thick: theſe Arms are mortiſed two inches deep into the Windſhaft, and are fixed to the fore ſides of the Arms W, &c. with ſcrews and nuts: all the framing of the head of the Mill is the ſame as in common Mills.

PLATE II. FIG. 2.

A Perſpective View of the MILL, *taken from the Hind Side and Fore End.*

A, A, &c. The Walls that form the baſe of the Mill.

B, B, &c. The Groundſels.

C, C, &c. The principal Poſts.

D, The ſquare Frame, fixed on the upper ends of the principal Poſts C, C, C, C.

E, E, &c. Four Rails, framed into the Poſts, C, C, &c.

F, F, &c. The ſhort Poſts, that ſupport the Rails E, G, and H.

G, H, The Rails, on which the hollow Trunk ſtands.

I, The Rails of the upper Frame to ſupport the Trunk.

K, The octangular hollow Trunk.

L, The ſquare Frame, fixed on the Frame D, the better to ſecure the Trunk K.

M, The perpendicular Shaft.

N, The Wallower, at the under end of the perpendicular Shaft.

Plate 2.

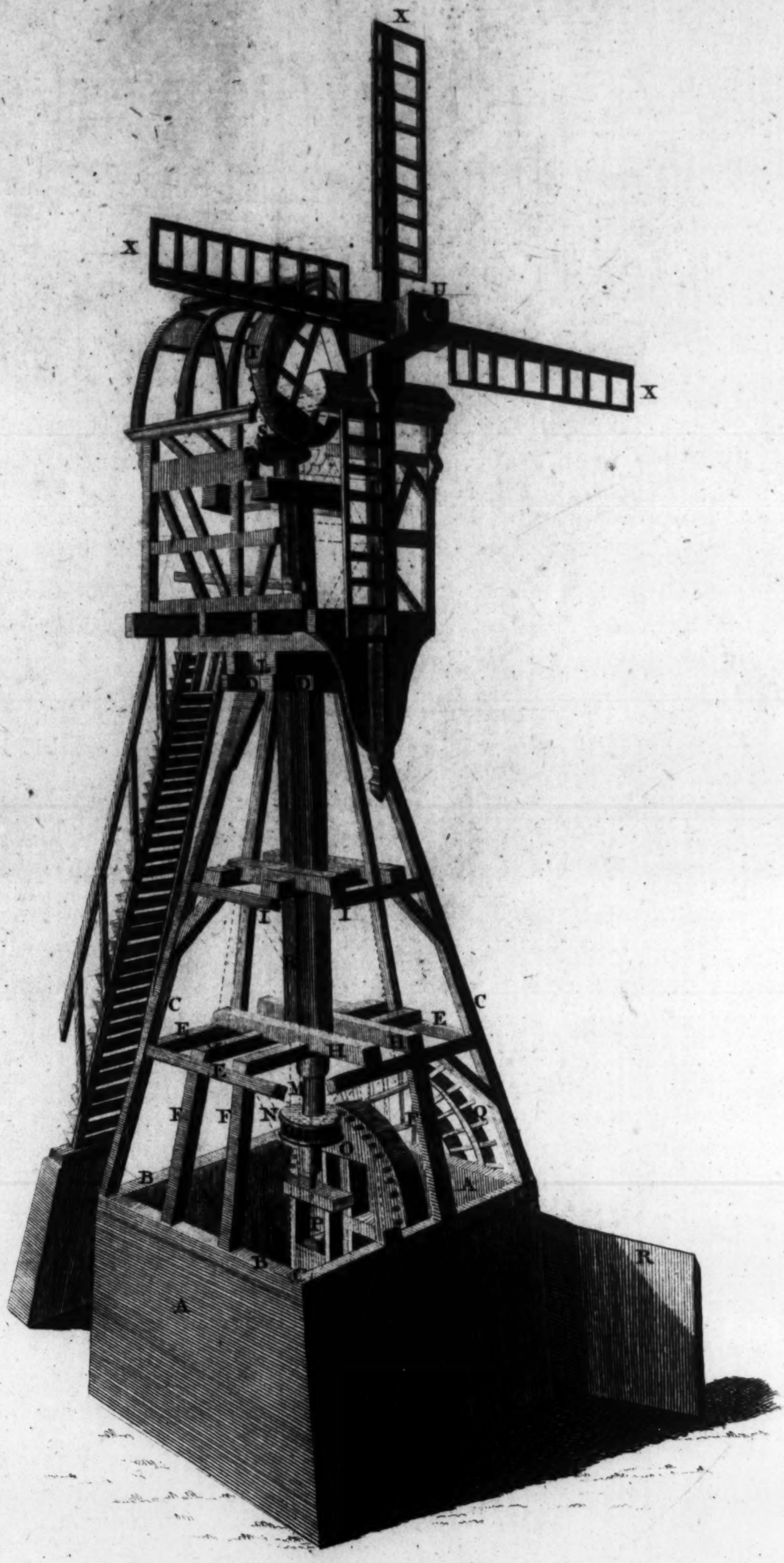

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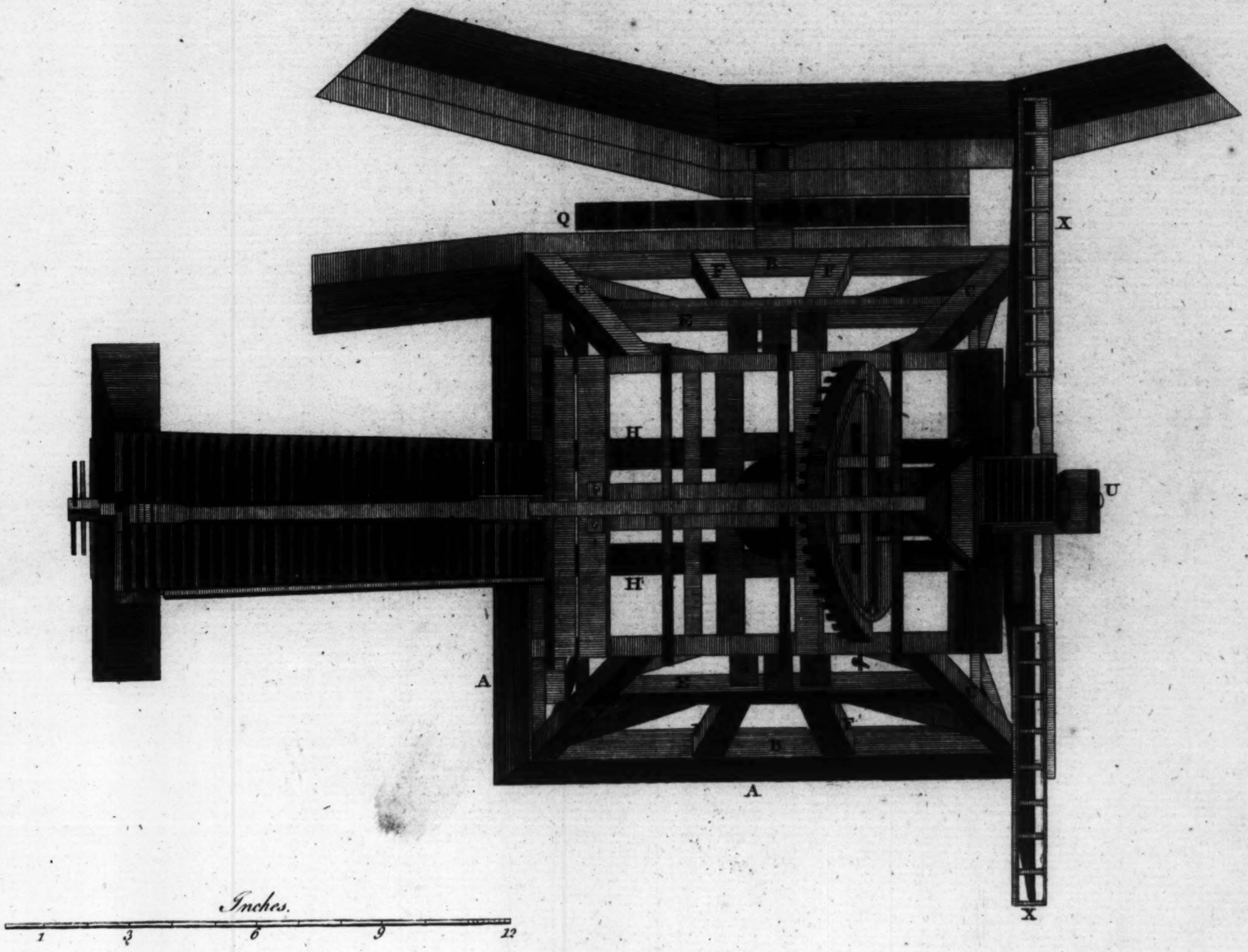
Plate 3.



O, The vertical Crown-wheel, fixed on the Shaft P of the Scoop-wheel.

P, The Shaft of the Scoop-wheel.

Q, The Scoop-wheel.

R, The Wall, that embraces the outer ſide of the Scoop-wheel, and prevents the water from running back.

S, The Wallower, on the upper end of the Shaft M.

T, The Crown-wheel, that actuates the Wallower S, fixed on the Wind-ſhaft U.

U, The Wind-ſhaft, ſet to an angle of fourteen degrees with the horizon.

X, X, The Sails.

PLATE III. FIG. 3.

A, A, &c. The Walls of the Baſe, on which the Mill is erected.

B, B, &c. The Sills of the Mill.

C, C, &c. The principal Poſts.

E, E, &c. The under ſet of Rails.

F, F, The ſhort Poſts, that ſupport the Rails E and G.

G, H, The croſs Rails, fixed on the Rails E, to ſupport the Trunk M.

P, The Shaft of the Scoop-wheel.

Q, The Scoop-wheel.

R, The Wall, that, embracing the outer ſide of the Scoop-wheel, forms a channel for the water, which is raiſed three feet in height by the revolution of the Scoop-wheel.

S, The Wallower, fixed on the upper end of the Shaft M.

T, The vertical Crown-wheel, fixed on the Wind-ſhaft.

U, The Wind-ſhaft.

X, X, &c. The Sails.

Theſe Mills were preſented to the Society by Mr. *Collier*, *May* 31, 1758.

CHAP. III.

A Deſcription of Mr. CHARLES LLOYD's HAND-MILL *for grinding Corn.*

PLATE I.

A Perſpective View of the MILL.

A, A, THE Groundſels, on which the Mill ſtands: theſe Sills are three feet three inches long, three inches and a half broad, and two inches three fourths thick.

B, B, &c. The four upright Poſts, four feet long from ſhoulder to ſhoulder of their tenons, and two inches three fourths ſquare: theſe Poſts are framed into the Sills A, and the ſide Rails C.

C, C, The ſide Rails, two feet ſix inches long, and two inches and three fourths ſquare, framed on the Poſts A.

D, D, The fore and hind Top-rails, one foot ſix inches and a half long from ſhoulder to ſhoulder of their tenons, four inches and a half broad, and an inch and one twelfth thick: theſe Rails are framed into the upper ends of the Poſts B, and Rails C.

E, E, The fore and hind middle Rails, one foot ſix inches and a half long from ſhoulder to ſhoulder of their tenons, and two inches and a half ſquare, framed into the Poſts B, two feet four inches above the upper ſurface of the Sills A.

F, F, The middle ſide Rails, the ſame length, breadth, and thickneſs as the Rails E, framed into the Poſts B, two feet one inch and a half above the upper ſurface of the Groundſels.

G, G, Two croſs Rails, two feet long, three inches broad, and two inches thick: theſe Rails are halved, and nailed on the upper ſurface of the Sills A, and cloſe to the Poſts B.

H, H, &c. Four Brackets, fixed to the under ends of the Poſts B, and Sills A.

I, I, Two Winches, whoſe radius is one foot two inches.

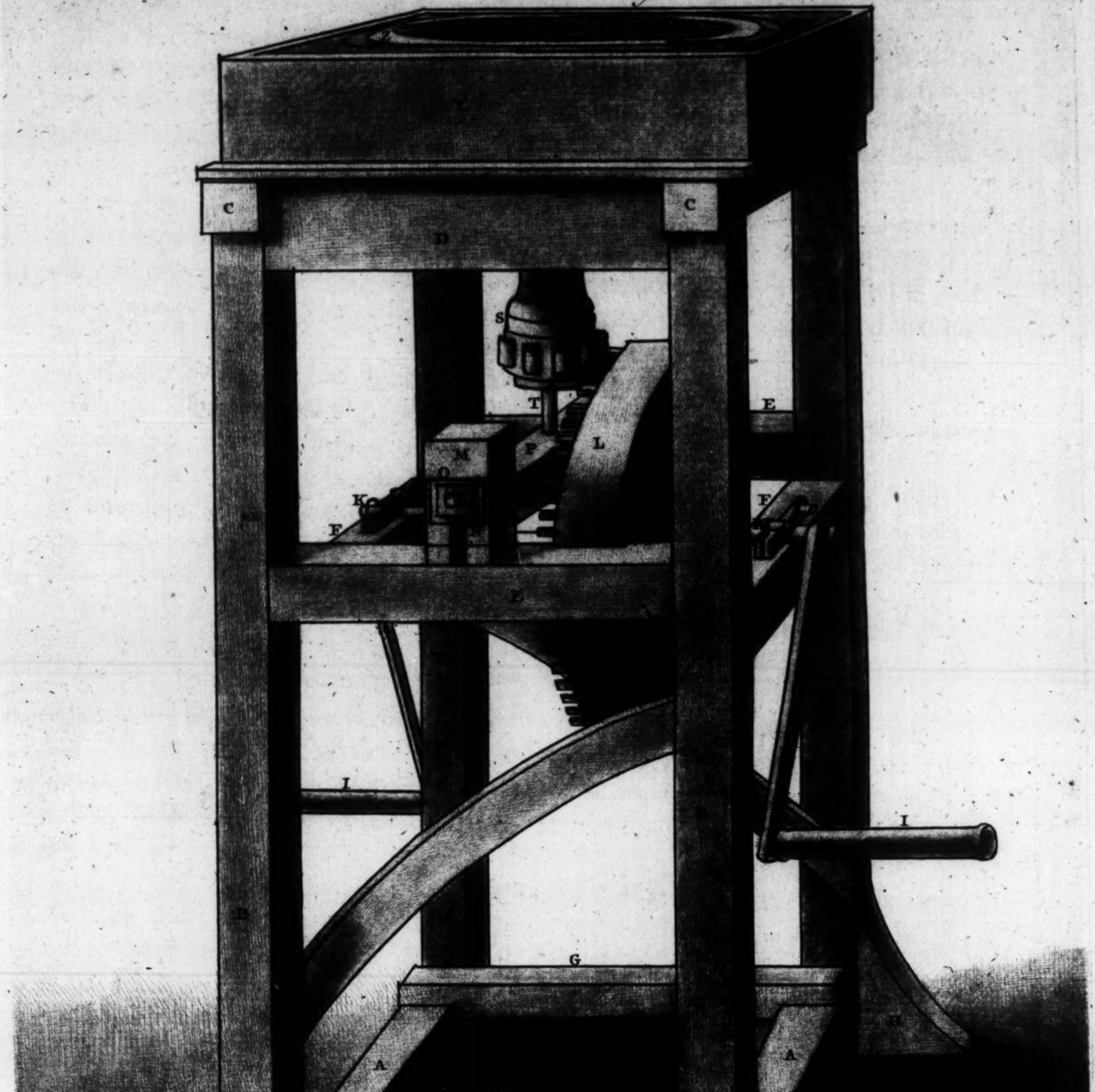
K, The Axis of the Crown-wheel L: this Axis is one foot ſix inches long, two inches and a half ſquare where the Crown-wheel L is fixed on it: all the other part of it is octangular: this Axis turns on two iron Spindles, an inch ſquare, working in braſs ſockets.

L, The Crown-wheel, which gives motion to the upper ſtone: this Wheel is one foot ten inches diameter, having forty cogs.

M, A Poſt, ſix inches long, three inches broad, and two inches and a half thick, framed on the middle of the upper ſurface of the Rail E, having a mortiſe through it two inches long, and an inch broad.

N, An iron Waſhee, two inches and a half ſquare, and three eighths of an inch thick, having a hole through the middle an inch diameter for the iron ſcrew-bolt to O paſs through it.

A Perspective View of Mr. Lloyds Hand-mill for grinding Corn.
Plate 1. Fig. 1.



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O, An iron Screw-bolt, eight inches long, and ſeven eighths of an inch diameter: one end of this Bolt is flatted, and let in fluſh with the upper ſurface of the Bridge-tree P, and nailed faſt thereto; its fore end, paſſing through the mortiſe and waſhee N, is fixed to its place with the iron nut.

P, The Bridge-tree: its length from the back end to the ſhoulder of its tenon is one foot ſix inches; its extreme breadth three inches and a half, and two inches and a half thick: the back end of it is cut aſlant, to admit a wedge, by which the Bridge-tree is ſet forward or backward, to bring the ſtone to a horizontal poſition.

Q, A wooden Screw and Nut: its extreme length is one foot three inches; its ſcrew-part is nine inches long, and three fourths of an inch diameter; its under part two inches ſquare, ſliding in a mortiſe in the middle of the Rail E, and has a mortiſe in it to receive the tenon of the Bridge-tree; its upper end paſſing through a hole in the middle of the Rail, is ſupported by the Nut of the Screw, by which means the upper ſtone is ſet higher or lower, as need requires.

R, The Rail, through which the Screw paſſes, and by which the upper ſtone is ſupported to a proper bearing.

S, A Pinion, ſix inches diameter, having ten cogs: this Pinion is fixed on an iron ſpindle, one foot ſix inches long, and three fourths of an inch ſquare: the under pivot of this ſpindle turns on a braſs nut, in the middle of the upper ſurface of the Bridge-tree P.

T, An iron Spindle, one foot ſix inches long, and three fourths of an inch ſquare, on which is fixed the Pinion S, and the upper Mill-ſtone a, which is one foot two inches diameter. See Plate II, Fig. 2.

U, The Hurſt-board, or bed of the Mill, into which the under ſtone is let, half the thickneſs of the Board, and fixed in a horizontal poſition: this Board is ſeventeen inches ſquare, and four inches thick, and is fixed with ſtrong ſcrews to the under ſide of the Board X, therefore is not to be ſeen in either of the Plates.

X, A Board, two feet one inch and a half ſquare, and one inch thick, fixed on the upper ſurface of the Rails C and D, having an aperture in the middle of it, to let the under ſtone paſs through it.

Y, The Kerb, two feet one inch and a half ſquare, and ſix inches deep, made of half inch boards.

Z, A hollow circular Fly, two feet diameter, three inches and a half broad on its rim, and five inches deep: this Fly is divided into ſix diviſions, into which is put a quantity of lead ſhot, to bring it to a proper weight: it is fixed on the upper ſtone with iron ſtraps. See Plate II.

The Frame and Hopper are the ſame as in other Mills, and are therefore left out to ſhew the Stone and Fly.

PLATE II. FIG. 2.

A Plan, ſhewing the upper STONE, FLY, *and* KERB.

Y, The Kerb. See the deſcription, Fig. 1.

Z, The Fly, whoſe diviſions for the ſhots are covered with wainſcot covers, one fourth of an inch thick, to prevent the ſhot from being thrown out.

a, The upper Stone, one foot two inches diameter, to which the Fly Z is fixed.

FIG. 3.

A Plan of the Cover of the KERB, *the* BIN, *and its* FRAME.

b, The Cover of the Kerb, two feet and an inch ſquare, and half an inch thick, having a hole in the middle of it, eight inches diameter, through which the corn paſſes from the bin and hopper to the ſtones.

c, The Frame, on which the bin is fixed: this Frame is two feet three inches long, one foot and an inch broad, and eight inches high, having a croſs Rail in the middle of it, in which the upper pivot of the ſpindle of the upper ſtone turns: it is fixed on the Cover b with wood-ſcrews.

d, The Bin, one foot three inches ſquare at its upper ſurface, and three inches ſquare at its under end, and is nine inches deep, reſting on the outer end of the Frame.

This Mill was tried before the Committee of Mechanics, who were of opinion that *Mr. Lloyd* was deſerving a bounty of Fifty Pounds, and Twenty Guineas for his expences in bringing the Mill from *Wales*, provided he left the Mill and Stones belonging thereto with the Society; to which the Society agreed, *March* 25, 1761. See the Account of it, Book VIII. Chap. IV. of the firſt Volume of this work.

CHAP.

Plate 2d. of Mr. Lloyd's Hand-Mill.

Fig. 3.

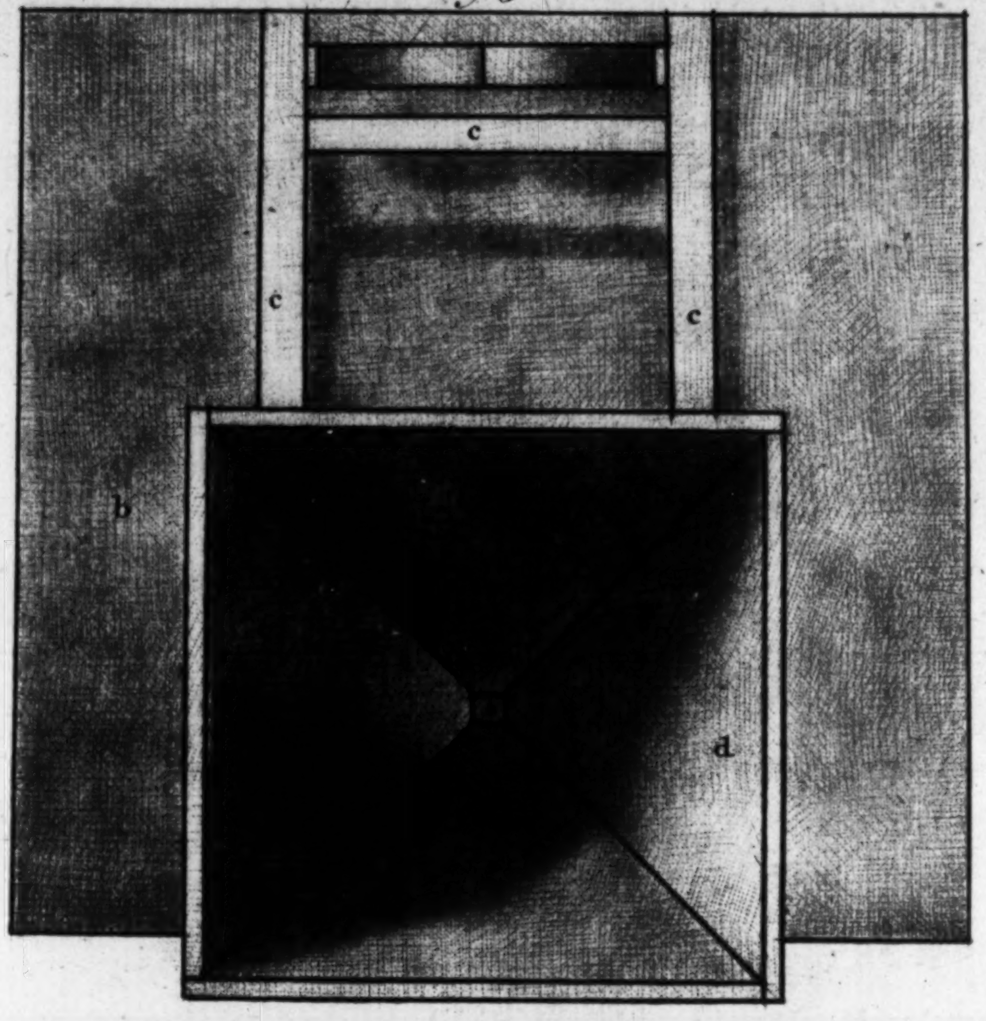
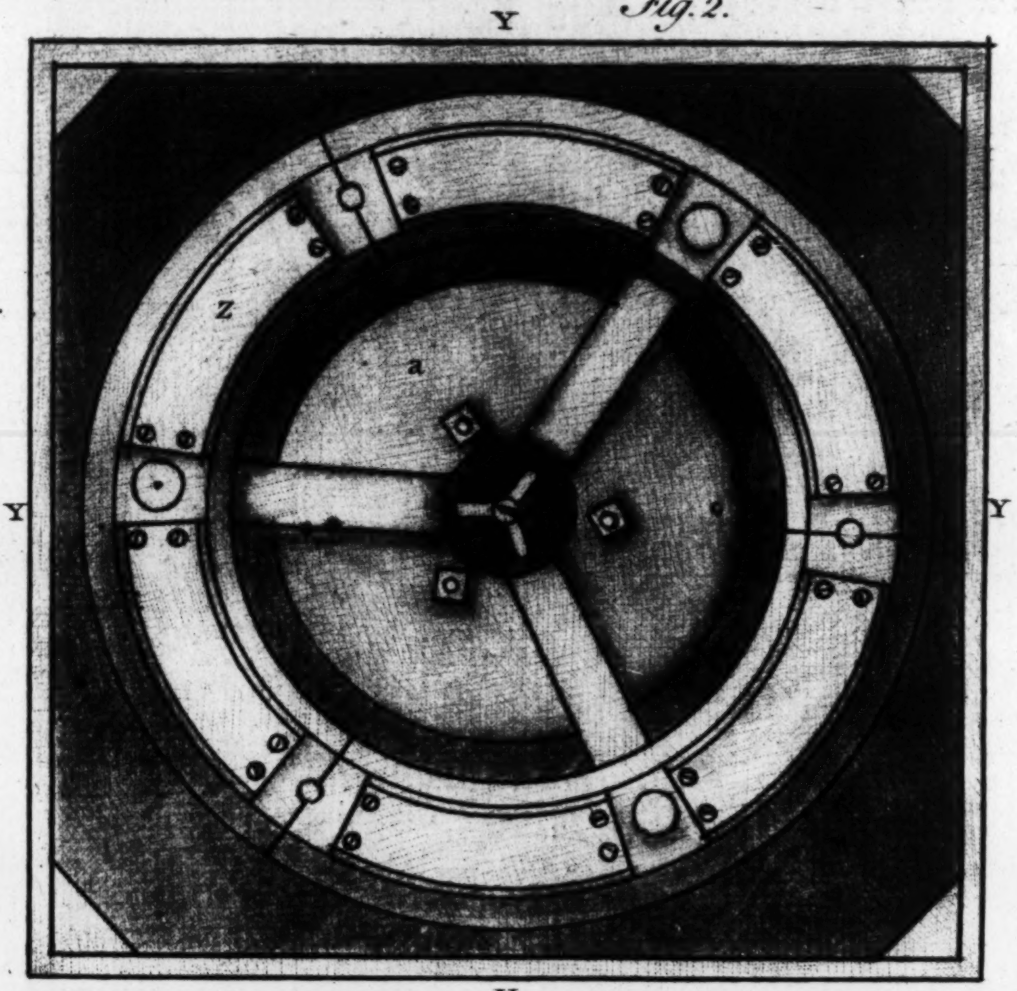


Fig. 2.



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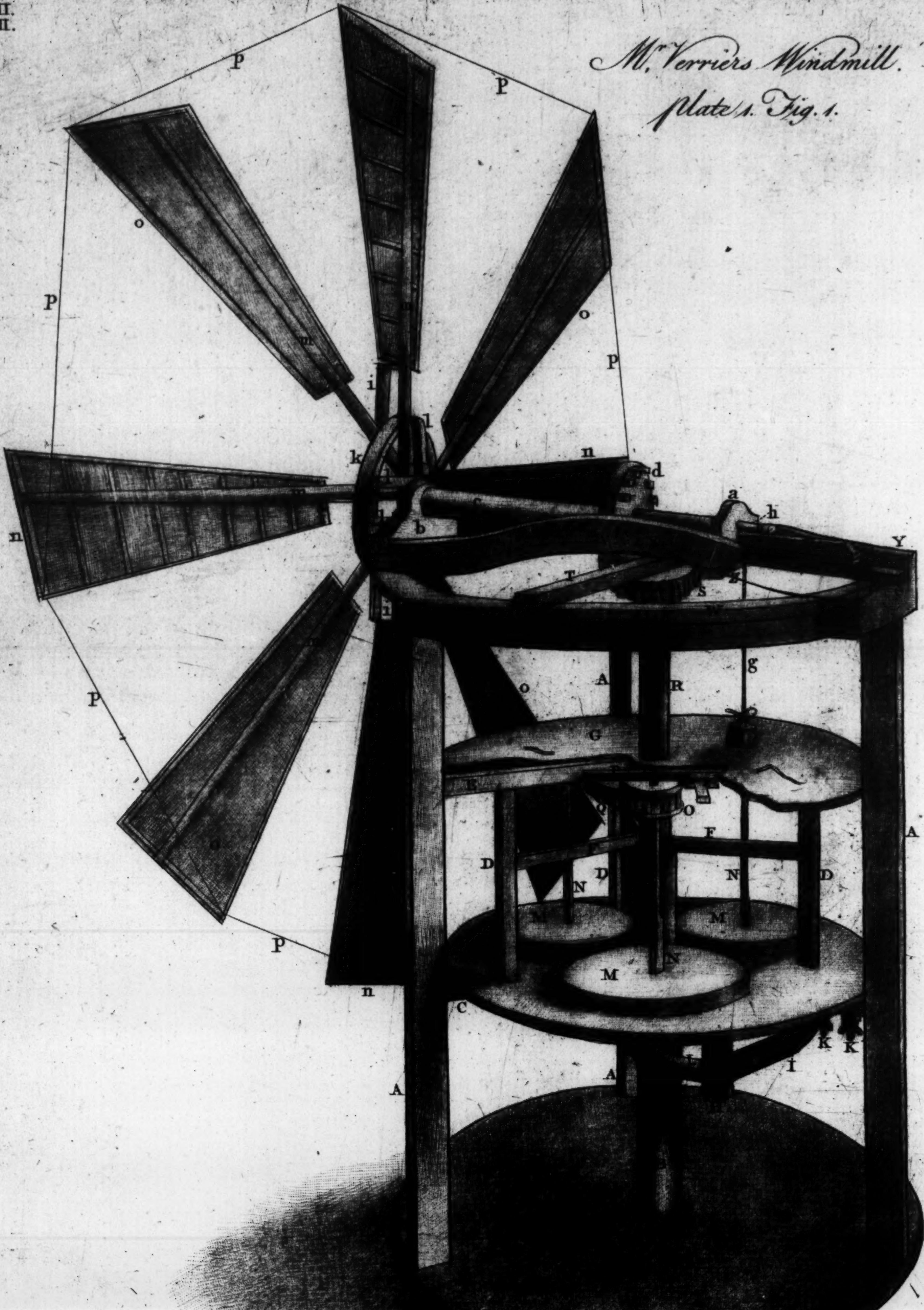
Mr. Verriers Windmill.
plate 1. Fig. 1.



C H A P. IV.

A Deſcription of Mr. JAMES VERRIER's WIND-MILL.

PLATE I. FIG. 1.

A, A, A, THREE of the principal Poſts of the Mill: their length from the ground-floor to the kerb is twenty feet ſeven inches and a half: their breadth at their under ends one foot ten inches, and at their upper ends one foot ſix inches, and one foot five inches thick.

B, A Column, twelve feet ten inches and a half long, one foot ſeven inches diameter at its under end, and one foot four inches at its upper end: this Column is fixed in the centre of the Mill, paſſing through the firſt floor; its upper end is ſecured by the Rails F, F, F.

C, C, C, The Girders of the firſt floor, eight feet three inches long, eleven inches broad, and nine thick, mortiſed into the principal Poſts, and into the Column eight feet three inches above the ground-floor.

D, D, D, Three Poſts, ſix feet four inches and a half long from ſhoulder to ſhoulder of their tenons, nine inches broad, and ſix inches thick: theſe Poſts are mortiſed into the girders of the firſt and ſecond floors two feet four inches diſtant from the Poſts A.

E, &c. The Girders of the ſecond floor, ſix feet long from ſhoulder to ſhoulder of their tenons, eleven inches broad, and nine thick: theſe Girders are mortiſed into the Poſts A, &c. and reſt on the upper ends of the Poſts D, &c.

F, F, F, Three Rails, three feet one inch and a half long from ſhoulder to ſhoulder of their tenons, ſeven inches broad, and three thick: theſe Rails are mortiſed into the Poſts D, and the upper end of the Column B, four feet three inches above the floor to their upper edges.

G, G, The Firſt, and a ſection of the ſecond Floor.

H, H, H The Arms of the Bray-trees: their extreme length is two feet four inches, eight inches broad, and ſix thick, having a mortiſe in the under end of each of them one foot two inches long, and three inches broad, to receive the tenons of the Bray-trees: their upper ends are ſhouldered on the angle, and nailed to the Girders C, &c. Note, only one of the Arms is ſeen in this view.

I, One of the Bray-trees, four feet nine inches long from the ſhoulder of its tenon, nine inches and a half broad, and ſeven thick, having a mortiſe through its ſide, one foot ſix inches from the ſhoulder of its tenon, to receive the tenon at the fore end of the Bridge-tree: the tenon of the Bray-tree paſſes through the mortiſe in the Arm H, and acts on a Bolt which is put through the Arm and the middle of the mortiſe.

K, K, Two of the iron Screw-bolts, by which the fore ends of the Bray-trees are raiſed or depreſſed.

L, One of the Bridge-trees, four feet ſix inches long from ſhoulder to ſhoulder of its tenons, nine inches broad, and ſeven thick: this Bridge-tree is curved nine inches from a ſtrait line; the tenon at its fore end paſſes through the mortiſe in the Bray-tree L, and the tenon at its back end through a mortiſe in an Arm of the ſame dimenſions as the Arm H: in the middle of the upper ſurface of the Bridge-tree is a plate of braſs, to receive the under pivot of the Mill-ſtones.

M, M, M, The Mill-ſtones.

N, N, N, The iron Spindles, on which the upper Stones are fixed: theſe Spindles are nine feet long; their extreme breadth and thickneſs is three inches and a half by two and one fourth.

O, One of the Wallowers, fixed on the upper end of the Spindle N: theſe Wallowers are one foot four inches and one fourth diameter, having fourteen Trundles each.

P, One of the Carriage-rails, in which the upper pivot of the Spindle turns: this Rail is four feet two inches long, ſeven inches broad, and four inches thick, turning on an iron Bolt at one end, the other end ſliding in a Bracket fixed to one of the joiſts, and forms a mortiſe, in which a wedge is driven, to ſet the Rail and Wallower in or out of its work.

Q, The horizontal Spur-wheel, that gives motion to the Wallowers: this Wheel is five feet ſix inches diameter, having forty-two cogs or teeth, and is fixed on the perpendicular Shaft R.

R, The perpendicular Shaft, nine feet and one inch long, and one foot two inches diameter, having two iron Spindles: the under Spindle turns in a braſs Block let fluſh into the upper end of the Column B: the upper Spindle turns in a braſs Plate inſerted into the under ſurface of the Carriage-rail T.

S, A Spur-wheel, three feet two inches diameter, having fifteen cogs: this wheel is fixed on the upper end of the perpendicular Shaft, and is connected to the Crown-wheel on the Wind-ſhaft.

T, The Carriage-rail, that ſupports the upper pivot of the perpendicular Shaft: this Rail is ſeventeen feet two inches long, one foot broad, and nine inches thick, fixed on the ſliding Kerb.

U, The fixed Kerb, ſeventeen feet three inches diameter, one foot two inches broad, and ten inches thick: this Kerb is mortiſed on the upper ends of the Poſts A, A, A, and fixed with ſtrong iron Screw-bolts: on the upper ſurface of the Kerb are inſerted twelve Friction-rollers, on which the ſliding Kerb revolves.

W, The ſliding Kerb, the ſame diameter as the fixed Kerb U: it is one foot two inches broad, and ſeven inches and a half thick, and revolves on the Friction-rollers inſerted into the fixed Kerb, having four iron half ſtaples fixed on its outer edge, the perpendicular Arms of which are ten inches long, two inches broad, and an inch thick.

X, X, Two of the half Staples: their perpendicular Arms, embracing the outer edge of the fixed Kerb, prevent it from being blown off.

Y, Y, The Capſills of the Mill, eighteen feet and nine inches long, one foot two inches broad, and one foot thick: theſe Sills are fixed at each end with ſtrong iron Screw-bolts to the Sliding-kerb, and alſo to the Carriage-rail T. See Plate 3.

Z, A Croſs-rail, ſeven feet long, one foot two inches broad, and one foot thick: this Rail is halved edgeways into the Capſills, and fixed thereto with ſtrong iron bolts. See Plate 3.

a, A Bracket, five feet long, one foot four inches in its extreme breadth, and ten inches thick: this Bracket is buſhed with a ſtrong braſs collar for the the under ſpindle of the Windſhaft to turn in; it is fixed, on the upper edge of the Croſs-rail Z, with iron ſcrew-bolts and nuts. See Plate 3.

b, A Bracket, ſeven feet long, four feet in its extreme breadth, and ten inches thick: this Bracket is let into the fore ends of the Capſills, and is fixed thereon with iron bolts: it is divided into two parts, to embrace the collar of the Windſhaft, and fixed together with ſcrew-bolts. See Plate 3.

c, The Windſhaft; its extreme length is fifteen feet; its diameter at its fore end is two feet, and one foot ſix inches at its back end; its pivot at the back end is ſix inches diameter: this Shaft has a hole bored through it, two inches one foot diameter, to admit the iron rod to paſs eaſily through it. See Plate 3.

d, A vertical Crown-wheel, ſix feet diameter, having fifty-four cogs, or teeth, which turn the Spur-wheel S.

e, A Bolſter, ſix feet three inches long, one foot one inch broad, and ſix inches thick: this Bolſter is tenoned into the Croſs-rail Z, directly under the center of the Windſhaft, having a mortiſe through its fore end, in which is a a braſs pulley four inches diameter: the back end of the Bolſter is faſtened, on the upper ſurface of the Sliding-kerb, with a ſtrong ſcrew: the upper ſide of the Bolſter forms a rabbet, or groove, an inch and a half deep, for the Sliding-bolt to move in. See Plate 3, Fig. 3.

f, The Sliding-bolt, four feet nine inches long, nine inches broad, and four inches thick, having a rabbet on each ſide two inches and a half deep: on the upper ſurface of this Bolt, nine inches from its fore end, is fixed a braſs Stud, againſt which the back end of the iron Rod K bears. See Plate 3.

g, A Line, one end of which, paſſing over the braſs pulley before-mentioned, is fixed in the fore end of the Sliding-bolt f. See Plate 3. At the other end of this Line is hung a weight ſufficient to make the Sails face the wind equal to the ſtones employed; and, when the preſſure of the wind is more than ſufficient, the Sails turn on an edge, and preſs back the Sliding-bolt, which prevents their going with too great velocity: and, when the wind abates, the Sails are preſſed up to their place again.

h, The iron Rod, before deſcribed. See Plate 3, Fig. 3.

i, i, i, i, The four Cardinal Arms, by which the Sails are regulated: theſe Arms are fixed on the fore end of the iron Rod, ſcrewed to the end of the Rod and the fore edges of the Arms: their extreme length is ſix feet ſix inches from the center, one foot broad in the center, and five inches thick; at the outer ends of the Arms are fixed Lines, which connect the Arms to the Sails, by means of four ſegments of wheels, of one foot ſix inches radius, fixed on the inner ends of the Sails. See Plate 2, Fig. 2.

k, A Rim, nine feet ſix inches diameter, one foot broad, and ten inches thick.

l, l, l, l, Four Arms, fixed a-croſs the head of the Windſhaft, to which the Rim k is fixed with ſtrong iron bolts.

m, m, &c. The eight Arms of the Sails, eighteen feet ſix inches long: their extreme breadth is one foot, and thickneſs nine, gradually diminiſhing to their outer ends, where they are three inches diameter: the inner ends of the Arms are mortiſed into the head of the Windſhaft; they are alſo notched and fixed to the Rim k with iron bolts.

n, n, n, n, The four Cardinal Sails, thirteen feet long, eight feet broad at their outer ends, and three feet at their inner ends: theſe Sails are hung to the Arms with ſtrong hooks and eyes, driven into the middle rails of the Sails and the Arms.

o, o, o, o, The four aſſiſtant Sails; the ſame dimenſions as the Cardinal Sails, and fixed to the Arms in the ſame manner, and actuated by the line p, by which they are joined to the Cardinal Sails.

p, The Line that joins the Sails together.

PLATE II. FIG. 2.

A Perſpective View of the Front of the MILL-SAILS.

A, A, The principal Poſts.
B, The Column.
F, F, The Rails that ſecure the upper end of the Column.
G, G, The firſt and ſecond Floors.
H, One of the Arms of the Bray-trees.
I, One of the Bray-trees.
K, One of the Screws that ſupport the fore end of the Bray-trees.
L, One of the Bridge-trees.
M, M, M, The Mill-ſtones.
N, One of the Spindles, on which the upper Stones are fixed.
O, The Trundle, fixed on the upper end of the Spindle N.
T, The Carriage-rail, that ſupports the upper ſpindle of the perpendicular Shaft R.
d, The vertical Crown-wheel, fixed on the Windſhaft.
g, The Line and Weight, that preſs the ſails to the wind by drawing the Sliding-bolt againſt the point of the iron Rod h.
h, The iron Rod, on which the Cardinal Arms are fixed.
i, i, i, i, The Cardinal Arms.
k, The Rim, to which the Arms of the Sails are fixed.
m, m, &c. The Arms of the Sails.

Mr. Nerrior's Windmill.

Plate 2. Fig. 2.

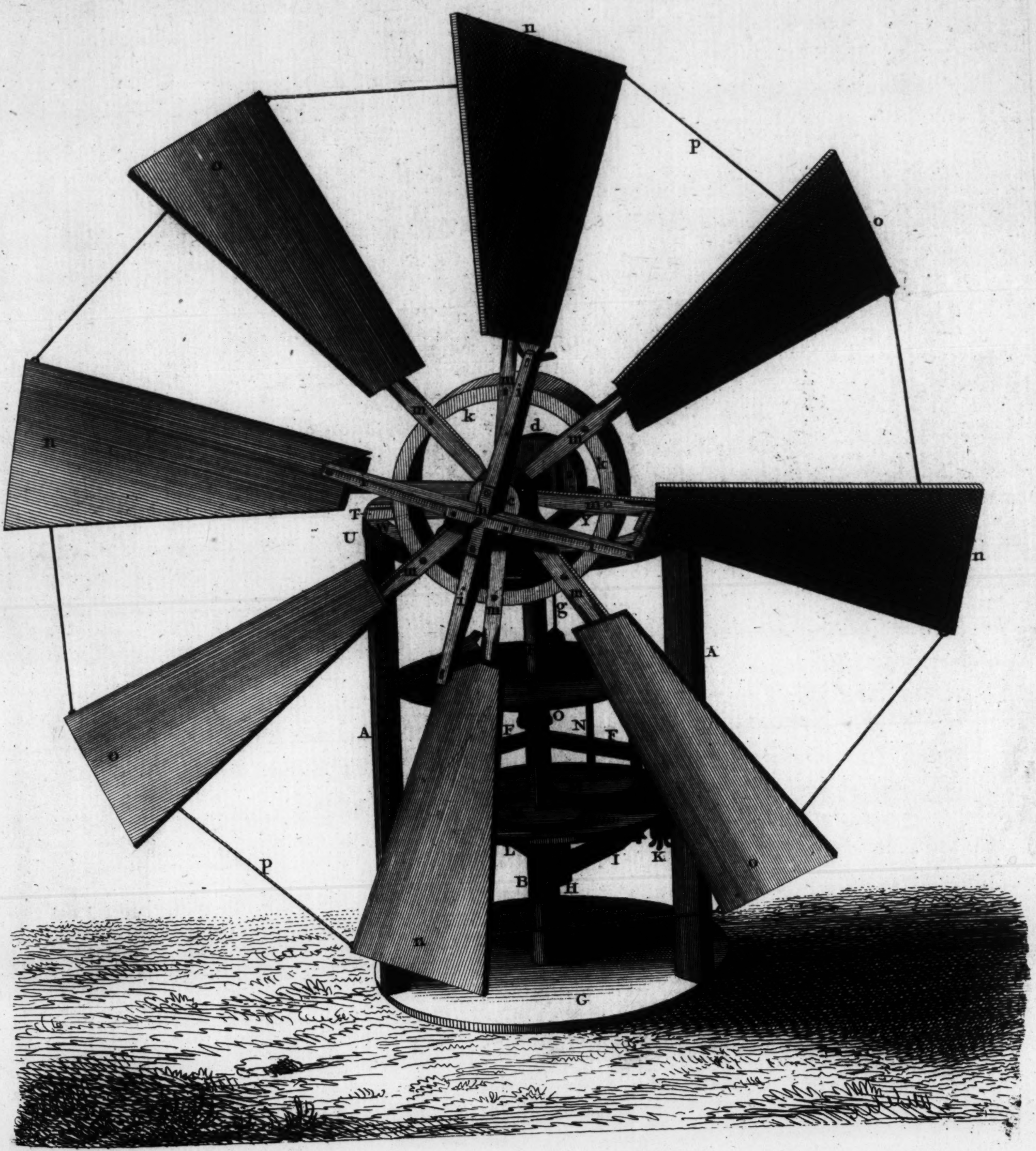


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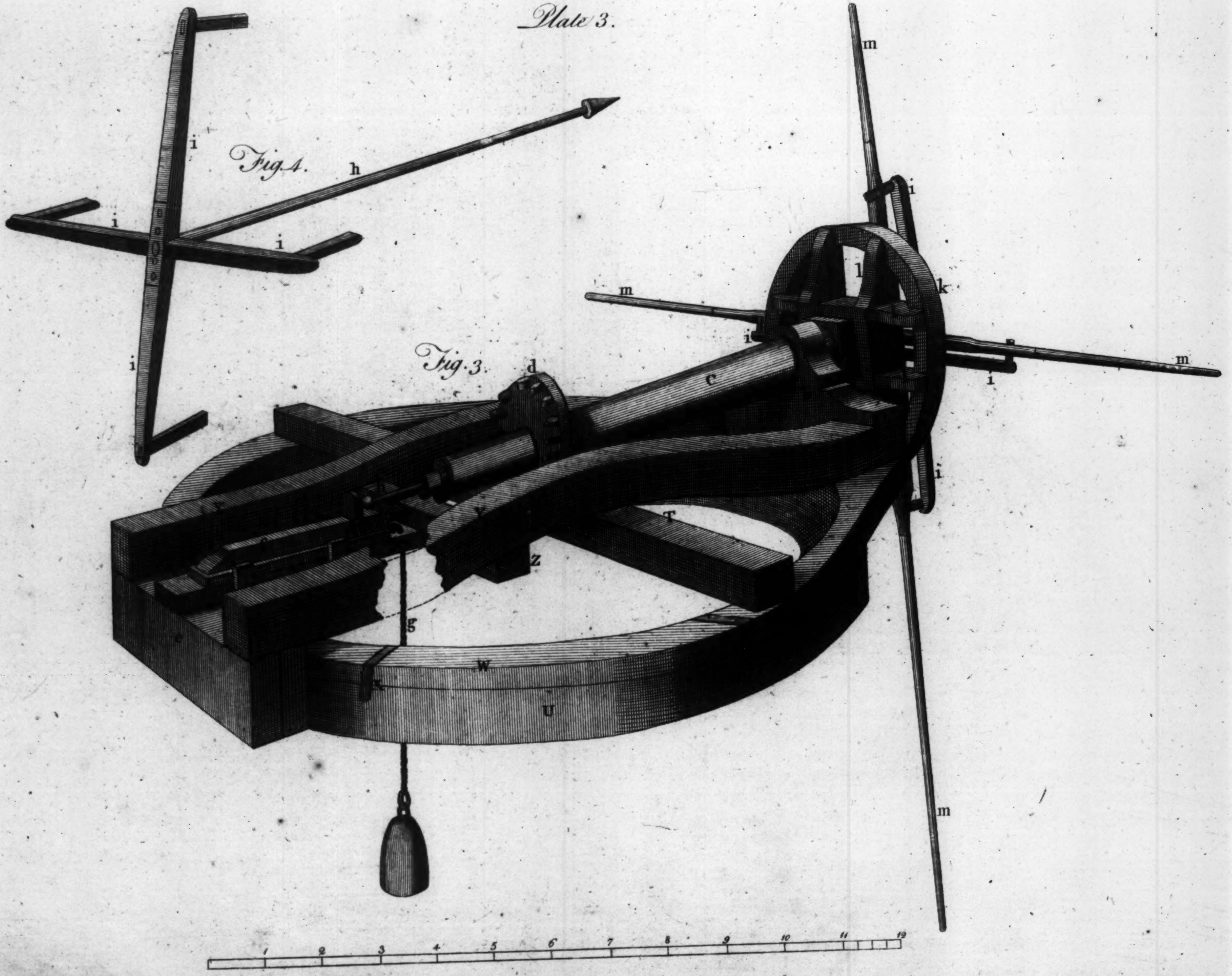
Plate 3.



n, n, n, n, The four Cardinal Sails.
o, o, o, o, The four aſſiſtant Sails.
p, The Line that joins the Sails to each other. Plate 3, Fig. 3.

PLATE III. FIG. 3.

T, The Carriage-rail, in which the upper pivot of the perpendicular Shaft turns. See Plate 1, Fig. 1.
U, The fixed Kerb. See Plate 1, Fig. 1.
W, The ſliding Kerb. See Plate 1, Fig. 1.
X, X, &c. The half Staples. See Plate 1.
Y, Y, The Capſills. See Plate 1, Fig. 1.
Z, The Croſs-rail, that ſupports the back end of the Windſhaft. See Plate 1, Fig. 1.
b, The Bracket, that ſupports the fore end of the Windſhaft. See Plate 1, Fig. 1.
c, The Windſhaft. See Plate 1, Fig. 1.
d, The vertical Crown-wheel. See Plate 1.
e, The Bolſter. See Plate 1.
f, The Sliding-bolt, by which the iron Rod h is preſſed forward. See Plate 1.
g, The Line, by which the Sliding-bolt and iron Rod is drawn forward. See Plate 1, Fig. 1.
h, The iron Rod.
i, The Cardinal Arms.
k, The circular Rim. See Plate 1.
l, l, l, l, The four Arms, by which the Rim is fixed to the Windſhaft and arms of the Sails. See Plate 1.
m, m, m, m, &c. The Arms of the Sails. See Plate 1, Fig. 1.

FIG. 4.

h, The iron Rod, that paſſes through the Windſhaft.
i, i, i, i, The Cardinal Arms.

This Model was examined by the Committee of Mechanics, who were of opinion that the Inventor of this Mill was well worthy of a bounty of Fifty Pounds; to which reſolution of the Committee the Society agreed, *December* 31, 1761.

CHAP.

CHAP. V.

A Deſcription of Mr. WILLIAM WESTGARTH's HYDRAULIC MACHINE, *for raiſing Water out of Mines.*

This MACHINE is repreſented as if cut through the middle, to ſhew the Piſtons and Valves.

FIG. I.

A, A, A, A, THE four Poſts, on which the beam and quarter-heads are ſupported, are eight feet long, three inches and a fourth broad, and an inch thick, tenanted into the Sills.

B, B, The Sills, into which the Poſts A, A, are mortiſed, are one foot ten inches long, three inches broad, and an inch thick.

C, A Ciſtern, that repreſents the Well, or bottom of the Mine, from from whence the water is pumped up into the trunk, or channel, that conveys the water out of the Mine.

D, The Box, or trunk of the Pump, ſix inches ſquare, having a valve, two inches and a half ſquare, and half an inch thick.

E, The Aperture, or water paſſage through the Box.

F, A braſs Pump-barrel, two feet long, and three inches and a half diameter; its inſide cavity two inches and a half.

G, The Piſton of the Pump, that raiſes the water from the bottom of the Mine, made fit to the inſide cavity of the Pump-barrel.

H, The Shut, or Trunk, that conveys the water from the Pump to the channel.

I, One of the Croſs-rails, that ſupports the trough that receives the water which deſcends from the top of the Mine, and alſo the water that is raiſed from the bottom of it, and conveys it into the channel: this Rail is one foot nine inches and three fourths long from ſhoulder to ſhoulder, three inches broad, and two thick, and is halved into the upright poſts one foot four inches high from their under ends to the under edge of the Rails.

K, A Brace, let into the upright Poſts, four feet ſeven inches high from their under ends to faſten them: from ſhoulder to ſhoulder this Brace is one foot nine inches and three fourths long, two inches and a half broad, and an inch thick,

L, One of the Rails, that ſupport the Trough, or Dam-head: this Rail is one foot nine inches long from ſhoulder to ſhoulder, three inches and one fourth broad, and two inches thick.

M, The Trough, or Dam-head, that receives the water from the rivulet at the top of the Mine, and by which the Machine is worked: this Trough is one foot ſix inches long, one foot two inches broad, and ſeven inches deep, all in

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XXXV.

A Section of Mr. Westgarths Hydraulic Machine.

Fig. 1.

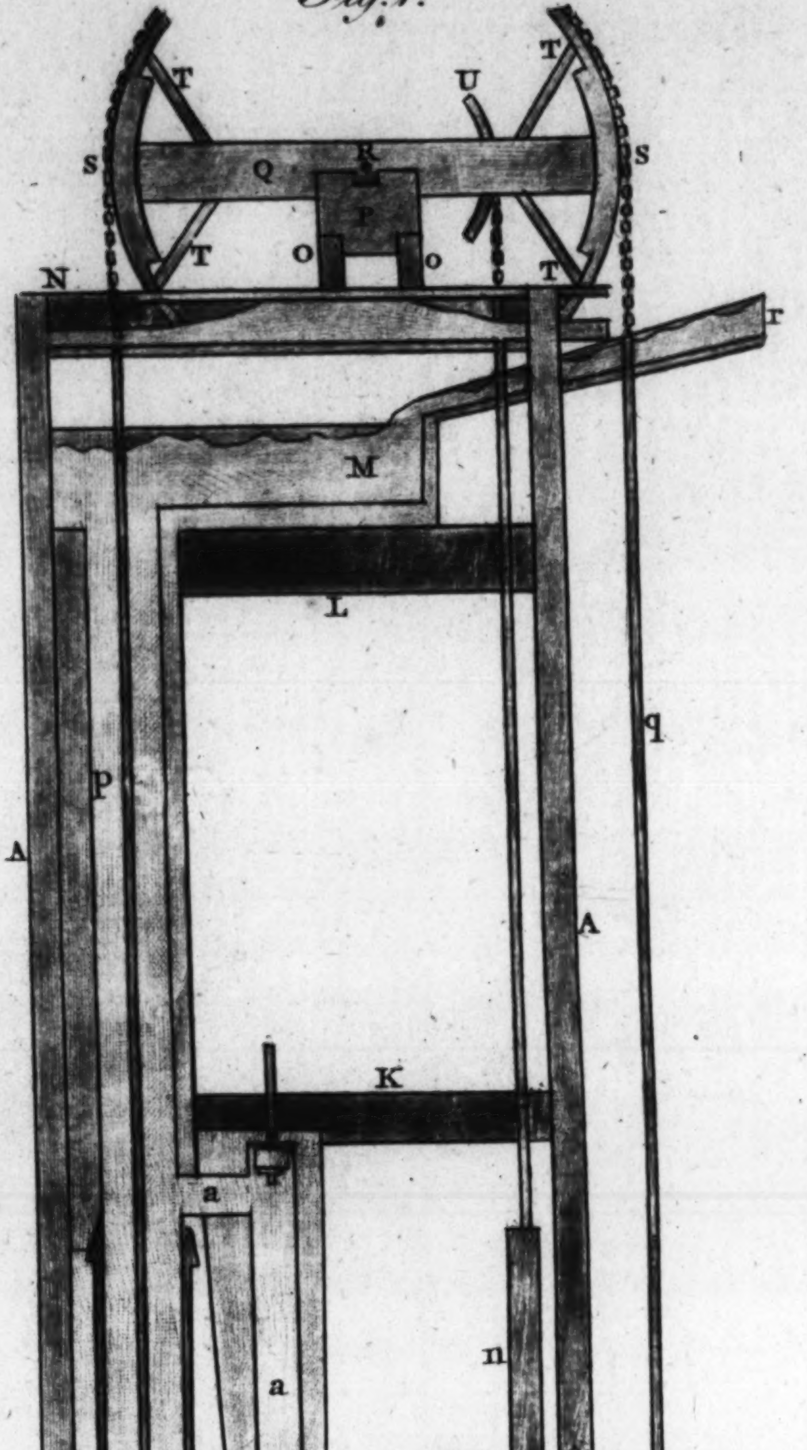


Fig. 2.

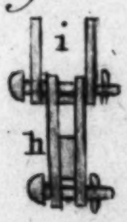


Fig. 4.

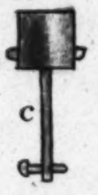
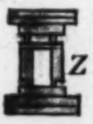


Fig. 3.



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in the clear; the ſides three fourths of an inch thick, and the bottom an inch and a half thick.

N, One of the top Rails of the Frame, one foot nine inches long from ſhoulder to ſhoulder, three inches broad, and an inch thick.

O, O, Two croſs Rails, or Joiſts, fixed on the Rails N N, are three inches broad, and an inch thick.

P, One of the Blocks of Wood, that ſupports the axis of the beam: theſe Blocks are five inches by four inches, and two inches thick; on the upper edge of which are two pieces of braſs or bell-metal, for the axis of the beam to work upon.

Q, The Beam, one foot four inches and a half long from ſhoulder to ſhoulder of its tenons, and three inches ſquare.

R, The Axis, on which the beam turns, is eight inches long, and three fourths of an inch diameter.

S, S, The Quarter-heads, by which the piſtons are actuated, are three inches broad, and two inches and a half thick: they are mortiſed on the ends of the beam, and are well ſecured thereto with the Braces T, T, T, T: their Radius is one foot, and the portion of their circle one foot three inches and one fourth; their ends are reduced to an inch and three fourths thick.

T, T, T, T, The four Braces, that fix the quarter-heads to the beam, are nine inches long, three inches broad, and an inch and a half thick, tenoned into the beam and quarter-heads.

U, The Quarter-head, that actuates the Plug-frame, or Counter-balance: its radius is ſix inches, its portion of a circle ſeven inches, its breadth and thickneſs an inch, and is faſtened to the ſide of the beam.

W, The Rod and Chain of the piſton, by which the Machine is actuated by the weight of water in its Cylinder, or Barrel.

X, The Barrel, or Cylinder, that receives the falling water to actuate the piſton, is five feet four inches and a half long, and is divided into three parts, viz. the upper part is two feet eight inches and a half long, of wood; the middle part, in which the piſton works, is two feet long; its under part is eight inches and a half long; its bore, or inſide cavity, three inches and a half.

Y, The Paſſage, by which the falling water is conveyed into the channel.

Z, The Valve and Conductor, by which the water, when the piſton deſcends, is conveyed into the channel; and, when the piſton begins to riſe, by ſhifting its poſition, admits the water to paſs through the Conveyance (a) into the Cylinder X under the piſton, and admits it to riſe again, till it overturns the Bob, or Drift, by which the poſition of the Conductor is alternately changed. See Fig. 3, and 4.

a, The Conveyance, through which the falling water paſſes, while the piſton is riſing: this Conveyance is two feet three inches and a half long, five inches and a half ſquare at the top, and four inches at the bottom, where it is jointed into the Box of the Valve, or Conductor Z: the cavity, or water-paſſage of this Conveyance, is two inches diameter.

b, The Box of the Conductor, ten is inches long, and five inches and a half ſquare, outſide, and is fixed with a ſquare iron hoop and ſcrews againſt end of the Barrel X.

c, The Rod, which actuates the Conductor, is ſix inches long, and half an inch thick, and flatted at each end, with a hole through the ends for the centre pins to paſs through, on which it moves.

d, The Lever, by which the Liſting-rod of the Conductor is actuated, is nine inches long, and half an inch thick, flatted at each end, and in the middle: its back end is faſtened to the under part of the Barrel X with an iron pin; the middle part is joined to the Rod of the Conductor, and its fore end to the Rod e.

e, The Rod, that joins the Lever to the Crank f, is nine inches long, and half an inch thick.

f, The Crank, by which the Lever of the Conductor is connected to the Bob: its Arms are four inches long, and half an inch thick, and are ſet at right angles with each other, turning on a center pin ſcrewed into the portion of the Rail g, the under end of which is faſtened to the ſide of a trough, that conveys the water into the channel: the upper end of it is faſtened to the Rail K.

g, The Rail, againſt which the Crank, that communicates with the Lever and Driſt, is fixed, is two feet eleven inches long, two inches broad, and an inch thick, and is ſcrewed againſt the ſide of the trough, and againſt the inſide of the Rail K.

h, An Arm, that joins the Crank to the Bob, one end of it turning on a centre pin in the upper end of the Crank, the other end on a center pin in the Staple I. See Fig.

i, The Staple, whoſe ſide arms are four inches long; their upper ends are bent over the axis of the Bob, and turn looſely thereon: the uſe of this Staple is to ſupport the outer end of the Arm h.

k, The Axis of the Bob, one foot eleven inches long from the ſhoulder of its pivots, and three fourths of an inch ſquare, except three fourths of an inch in length each ſide the Bob, which is filed round, for the Staple I to turn on.

l, The upper end of the Bob, ſix inches and a half long, and three fourths of an inch ſquare, having a lead weight of about half a pound fixed on its upper end, with a ſcrew and nut.

m, m, The under end of the Bob conſiſts of two Arms, three inches long, and half an inch ſquare, forming an acute angle.

n, The Plug-frame, or Counter-balance, by which the Bob is alternately lifted, by means of two Arms fixed on the axis of the Bob, till it paſſes its center: the Plug-frame is one foot ſeven inches long, and an inch and three fourths ſquare, having a number of ſmall holes through the ſides of it, to receive the two pins that lift the Bob.

O, O, The two curved Arms, by which the Bob is lifted: their extreme length is five inches, their extreme breadth an inch, and half an inch thick.

p, The piſton Rod of the falling water, four feet ſeven inches and a half long, and half an inch ſquare.

q, The piſton Rod of the aſcending water, ſix feet ſeven inches long, and half an inch ſquare.

r, A portion of the Shut, that conveys the water from the rivulet into the upper trough.

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Mr. Clements Portable Iron Oven.
plate 1. Fig. 1.

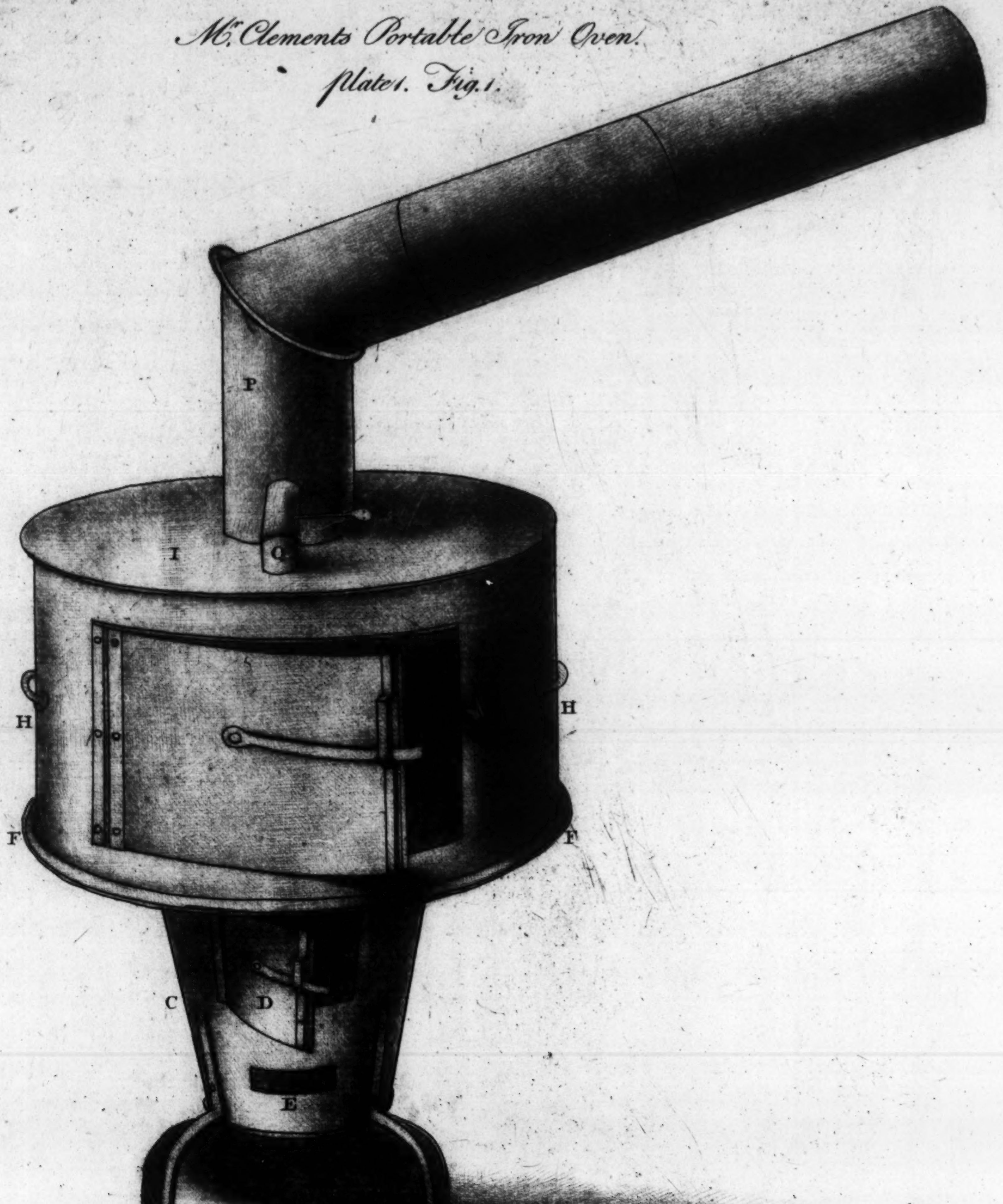


FIG. 2.

i, **The iron Staple, the upper end of which turns on the axis of the Bob; its under end ſupports the end of the Arm h.**

h, **The Arm that gives motion to the Crank f.**

FIG. 3.

Z, **The Valve, through which the water is conveyed from the Conveyance a into the under end of the Barrel X.**

FIG. 4.

c, The iron Rod and Conductor, or braſs Hoop, that covers half of the Valve: when this Conductor is lifted to the upper part of the Valve, the water is conveyed from the Barrel X into the Channel C; and, when it is at the under end of the Valve, the water paſſes from the Conveyance a into the Barrel as the piſton riſes.

This Model was worked in preſence of the Committee of Mechanics, and was ſtrongly recommended by *Mr. Smeton*, who has ſeen ſeveral Machines worked at large on this conſtruction. The Committee therefore recommended to the Society to give *Mr. Weſtgarth* a bounty of Fifty Guineas, he leaving the Model with the Society for the uſe of the Public.

This reſolution was agreed to by the Society, *May* the 24th, 1769.

N. B. For the particulars of *Mr. Smeton*'s account of this Machine, ſee Vol. I. of this Work, Book VIII, Chap. XXIII. Sect. 8.

CHAP. VI.

A Deſcription of Mr. CLEMENTS's OVEN.

PLATE I. FIG. 1.

A, A, A, THE Logs, on which the Oven ſtands, are ten inches long from the floor to the bottom of the ſtove, and from thence to their upper ends five inches; an inch broad, and three eighths of an inch thick: their upper ends are rivetted to the ſide of the ſtove in a triangular direction.

B, The Pan, that receives the aſhes, is one foot three inches and a half diameter; its Rim is three inches deep: this Pan is rivetted to the legs of the ſtove four inches above the floor.

C, The Stove, or Fire-place, one foot high, one foot and half an inch diameter at its upper end, and eight inches diameter at the bottom: its upper end is lapped to the under end of the cone of the Oven.

D, The Door of the Stove, four inches high, and ſeven broad; bent to fit the curve of the Stove, and has a hinge rivetted to its back edge and the ſide of the Stove.

E, An Aperture cut through the under end of the Stove and the Pan that contains the fire. See Plate 2, Fig. 2.

F, The caſt iron Pan that contains the fuel: its perpendicular height is ſeven inches; its bottom forming the grate or bars for the fire to lie on. See Plate 2, Fig. 2.

G, The cone of the Oven, four inches in perpendicular height: its under end is rivetted to the upper part of the Stove; its upper end is two feet and half an inch diameter. See Plate 2, Fig. 2.

H, The outer ſide, or wall of the Oven, two feet diameter, and one foot in perpendicular height, its upper and under ends being ſet off at right angles with the ſide forming a rim, to receive the laps of the cone and crown of the Oven. See Plate 2, Fig. 2.

I, The Crown of the Oven, two feet and half an inch diameter at its under edge, where it is lapped and fixed to the upper rim of the outer ſide or wall of the Oven: the perpendicular height of the Crown is two inches.

K, K, K, Three Brackets, rivetted in a triangular poſition againſt the inner ſide of the outer wall of the Oven, with their horizontal arms tending towards the center of it, to which the under plate of the bottom is rivetted. See Plate 2, Fig. 2, and 3.

L, L, The two Plates that form the bottom of the Oven: theſe Plates are one foot ſeven inches and a half diameter, and are rivetted to the under end of the inner ſide Plate or wall of the Oven, forming a cavity of half an inch. See Plate 2, Fig. 2.

M, The inner ſide, or wall of the Oven, is ten inches and one fourth in perpendicular height, and one foot ſeven inches and a half diameter.

N, The Head of the Oven, one foot ſeven inches and five eighths diameter, lapped or bent to the inner wall in the ſame manner as the Crown I is to the outer ſide H. See Plate 2, Fig. 2, and 3.

O, O, O, Three Brackets, by which the head of the Oven is fixed to the outer ſide of the Oven. See Plate 2, Fig. 3.

P, The Funnel, ſix inches diameter, by which the ſmoke is conveyed off.

Q, The Funnel that conveys the ſteam from the Oven into the Smoke-funnel: it is an inch and a half diameter, paſſes through the head and crown of the Oven, and with a mitre-joint is turned into the Smoke-funnel. See Plate 1, Fig. 1, and Plate 2, Fig. 4.

R, A regulating Valve, fixed in the upper part of the Steam-funnel: this Valve is a piece of plate iron, the ſize of the cavity of the Funnel, fixed to a piece of iron wire ſix inches long, and one fourth of an inch thick: the outer end

Plate 2.

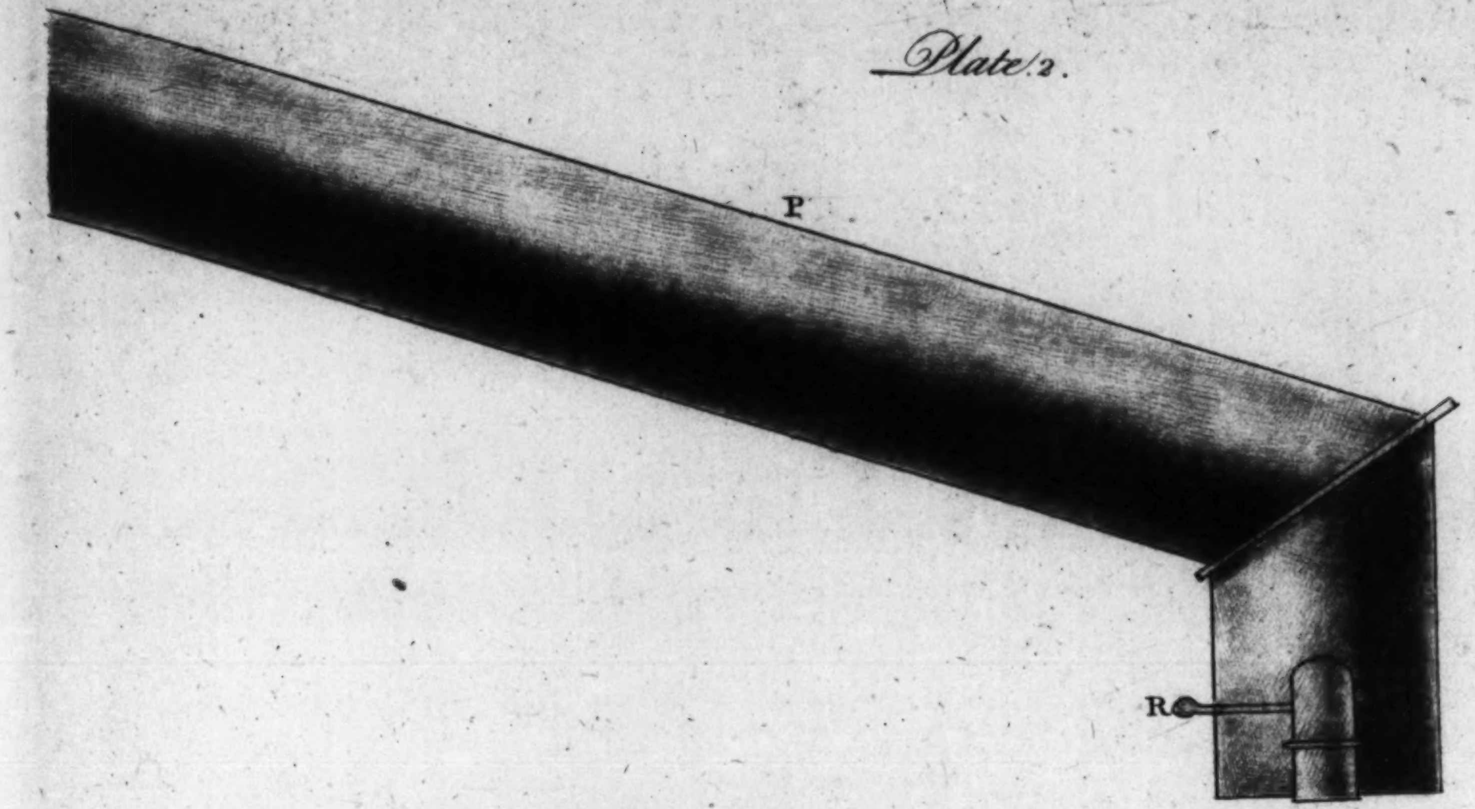


Fig. 4.

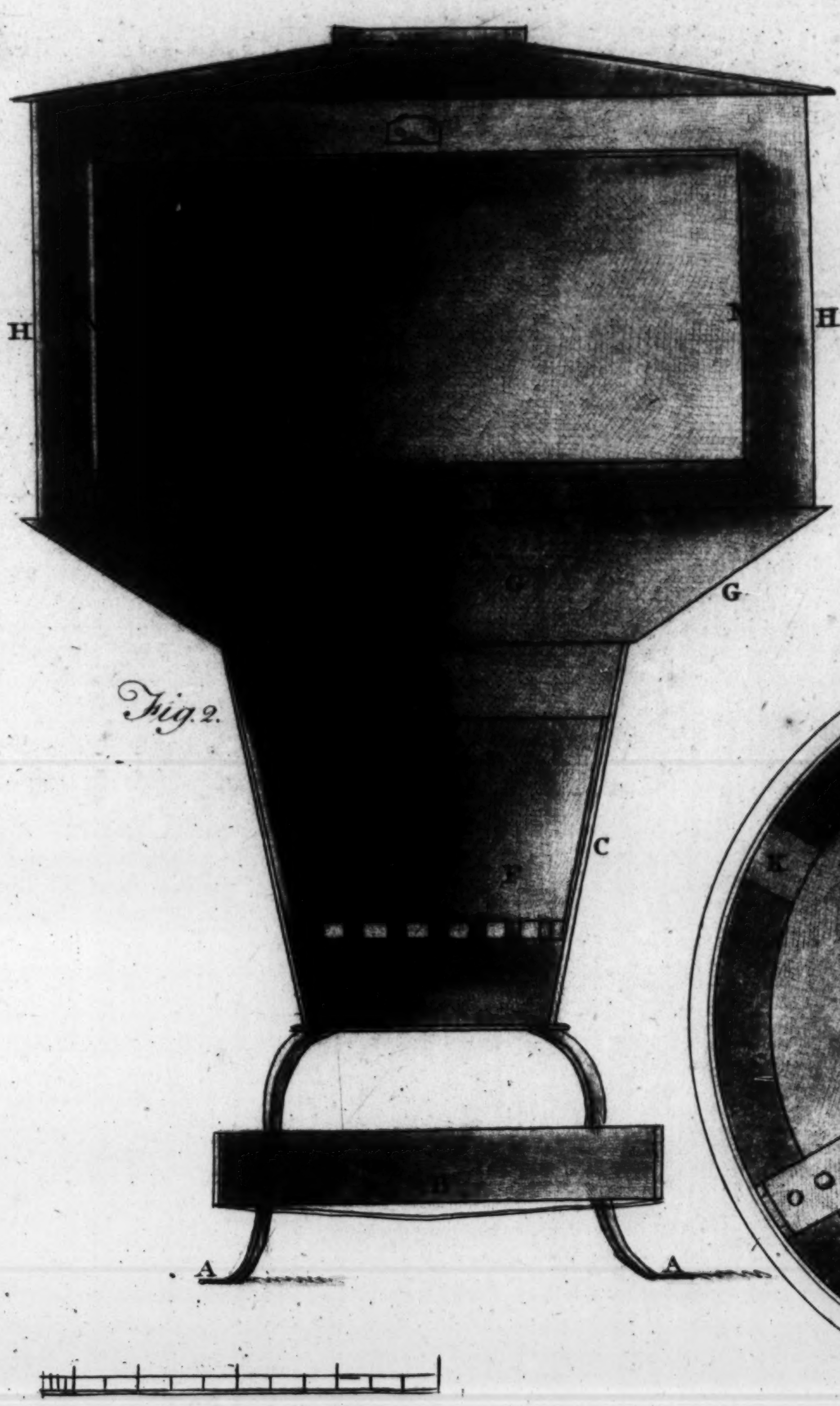
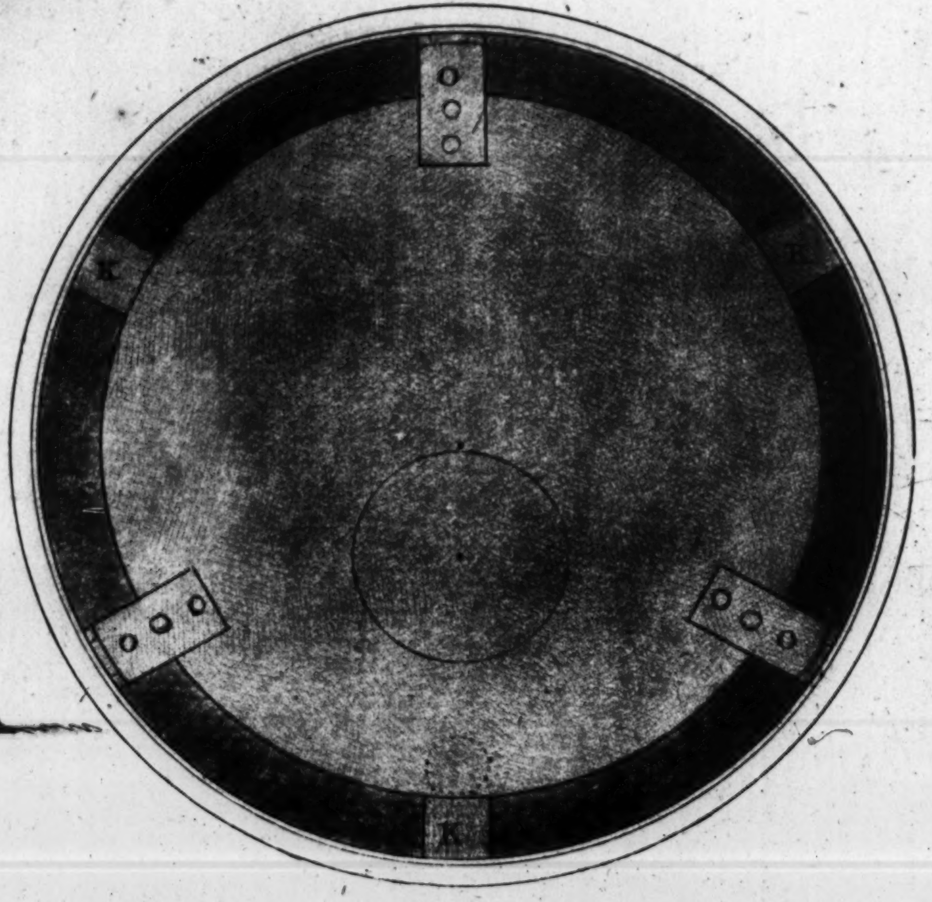


Fig. 2.

Fig. 3.



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A Perspective View of Mr. Stedmans Bolting-Mill.
Plate 1. Fig. 1.

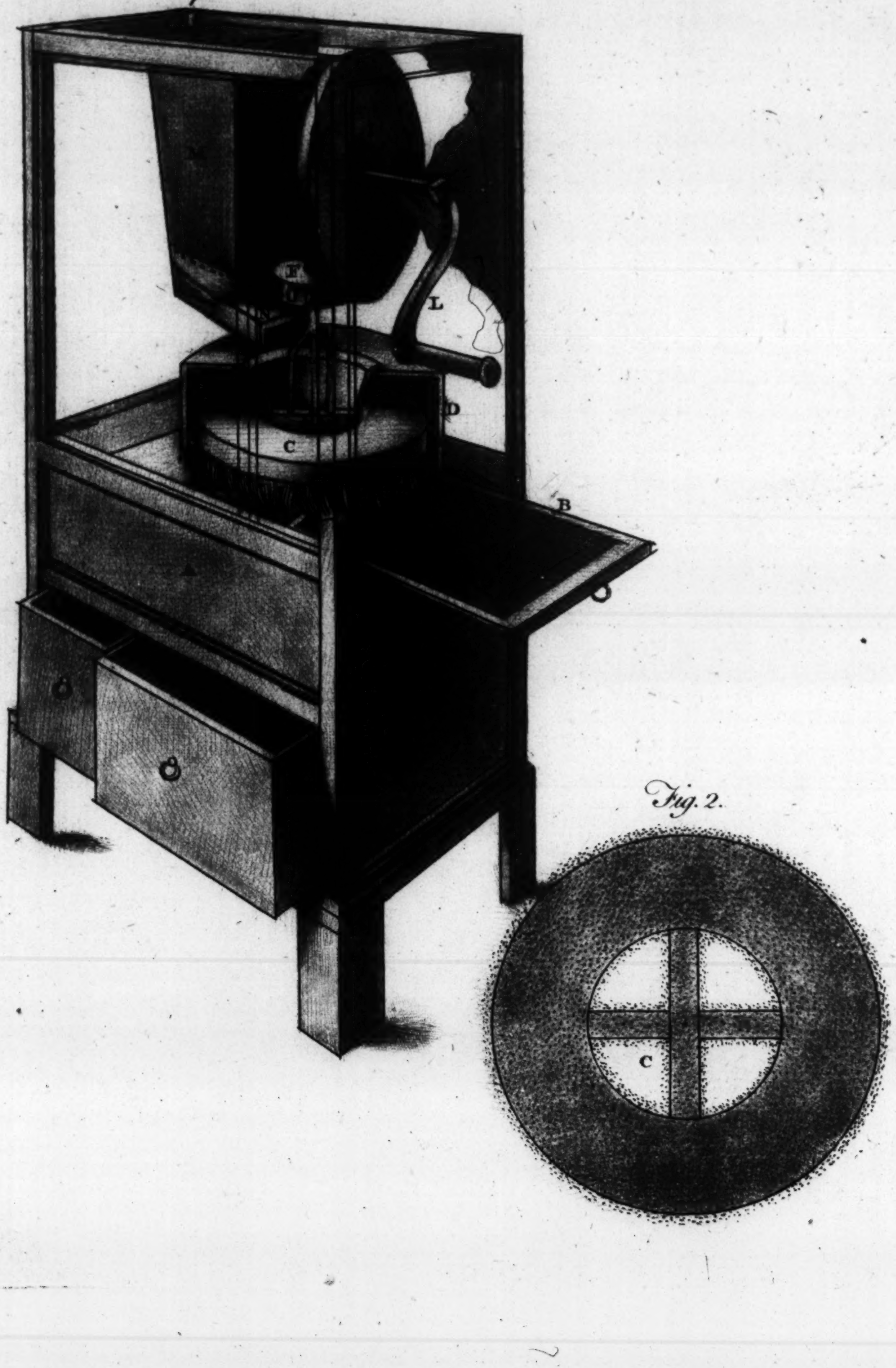


Fig. 2.

end of the wire is flatted, for the conveniency of turning it; the other end paſſes through the middle of the Funnel, and ſerves as pivots for the Valve.

The Committee examined this Oven, and were of opinion, both from the inſpection of it, and the teſtimony of the Regiſter, who had made frequent trials of it, that it will be uſeful to private families, where the Bakers Ovens are at too great a diſtance.

Reſolved to recommend to the Society to give *Mr. Clement* a bounty of Fifteen Guineas, he leaving the Oven with the Society for the uſe of the Public; to which the Society agreed *January* 17, 1770.

CHAP. VII.

A Deſcription of Mr. NATHANIEL STEDMAN's BOLTING-MILL.

PLATE I. FIG. 1.

A Perſpective View of the MILL, *with the circular Fence of the* BRUSH *laid open, and its Pannels left out, to ſhew the inner Work.*

A, THE Caſe of the Mill, four feet four inches high, three feet broad, and two feet two inches deep, having two draws in its front, one to receive the flour, and the other to receive the bran.

B, The Sieve through which the meal is ſifted: its frame is one foot eleven inches long, one foot eight inches broad, and five eighths of an inch thick, and is covered on its upper ſurface with fine wire cloth.

C, A Bruſh, one foot ſeven inches diameter: its rim is five inches broad, and one fourth thick: the arms of the Wheel are an inch and a half broad, and an inch and one fourth thick: the under ſurface, the block and arms, are filled with hogs-hair two inches long: this Bruſh is fixed on an iron ſpindle, the under end of which has four arms, that paſs through the arms of the Bruſh, and are fixed on its under ſide with iron nuts.

D, The Kerb, or Hoop, that incloſes the Bruſh, to prevent the meal from being ſcattered about the mill by the motion of the Bruſh: this Kerb is one foot eight inches diameter, and five inches and a half high, having a cover made of a half-inch board; in the middle of which is a tin conic rim, eight inches diameter at its upper ſurface, and ſeven inches at its under ſurface, and five inches deep; by which the meal is conveyed from the Hopper through the aperture in the Bruſh to the Sieve C.

E. E, Two Croſs-rails, fixed in the fore and back ſtyles of the caſe of the mill, in the middle of which the ſpindle of the Spur-wheel turns.

F, The Spur-wheel, eight inches and a half diameter, having twenty-one cogs, and is fixed on the iron Spindle G, one inch and a half above the upper ſurface of the under Rail E.

G, The iron Spindle, on which the Spur-wheel F and the Bruſh C are fixed: this Spindle is eleven inches long, excluſive of its arms, and five eighths of an inch diameter: it is ſuſpended by its upper pivot, which paſſing through the iron Frame H, the end of it is made into a ſcrew, which has an iron nut turned tight thereon, on which it revolves. See Fig. 3. and 4.

H, The iron Frame, on which the ſpindle of the Spur-wheel is ſuſpended: this Frame is eight inches long, one inch broad, and an eighth of an inch thick, having an aperture in each end to embrace the arms of the upper Frame, and an arch-head forming a ſemicircle, two inches diameter, with a ſcrew-bolt paſſing through it, and the upper Rail E, and a Wing-nut on the upper end of the bolt for the purpoſe of raiſing or depreſſing the Bruſh. See Plate 2.

I, The vertical Crown-wheel, which gives motion to the Spur-wheel and Bruſh: this Wheel is one foot two inches diameter, having thirty-five cogs.

K, The Spindle of the Crown-wheel I: its extreme length is one foot one inch and a half, and is ſeven eighths of an inch ſquare: its inner pivot turns on a braſs block fixed on the Rail E, having a knob at its end, to prevent its drawing out of its work: the outer pivot turns in the end pannel.

L, The Winch, whoſe radius is nine inches and a half; the Bin and Hopper, by which the meal is conveyed into the mill: the Bin is one foot four inches long, and eleven inches and a half by nine inches and a half at its upper end, and ſix inches ſquare at its under end.

N, The Hopper, is nine inches and a half long, ſix inches broad, and two deep, having an arm two inches and a half long, an inch broad, and half an inch thick: this arm, being drawn by a wire-ſpring againſt the arms of the Bruſh, ſhakes the meal into the mill.

FIG. 2.

C, A Plan of the under ſide of the Bruſh.

PLATE II. FIG. 3.

A Front View of the MILL.

A, The Caſe of the Mill.

D, The Kerb with its Cover, having an aperture in its under edge to convey the bran, &c. which cannot paſs through the ſieve then in uſe into the bran-draw.

E, E, The Rails, in which the ſpindle of the Spur-wheel and Bruſh turn.

F, The Spur-wheel.

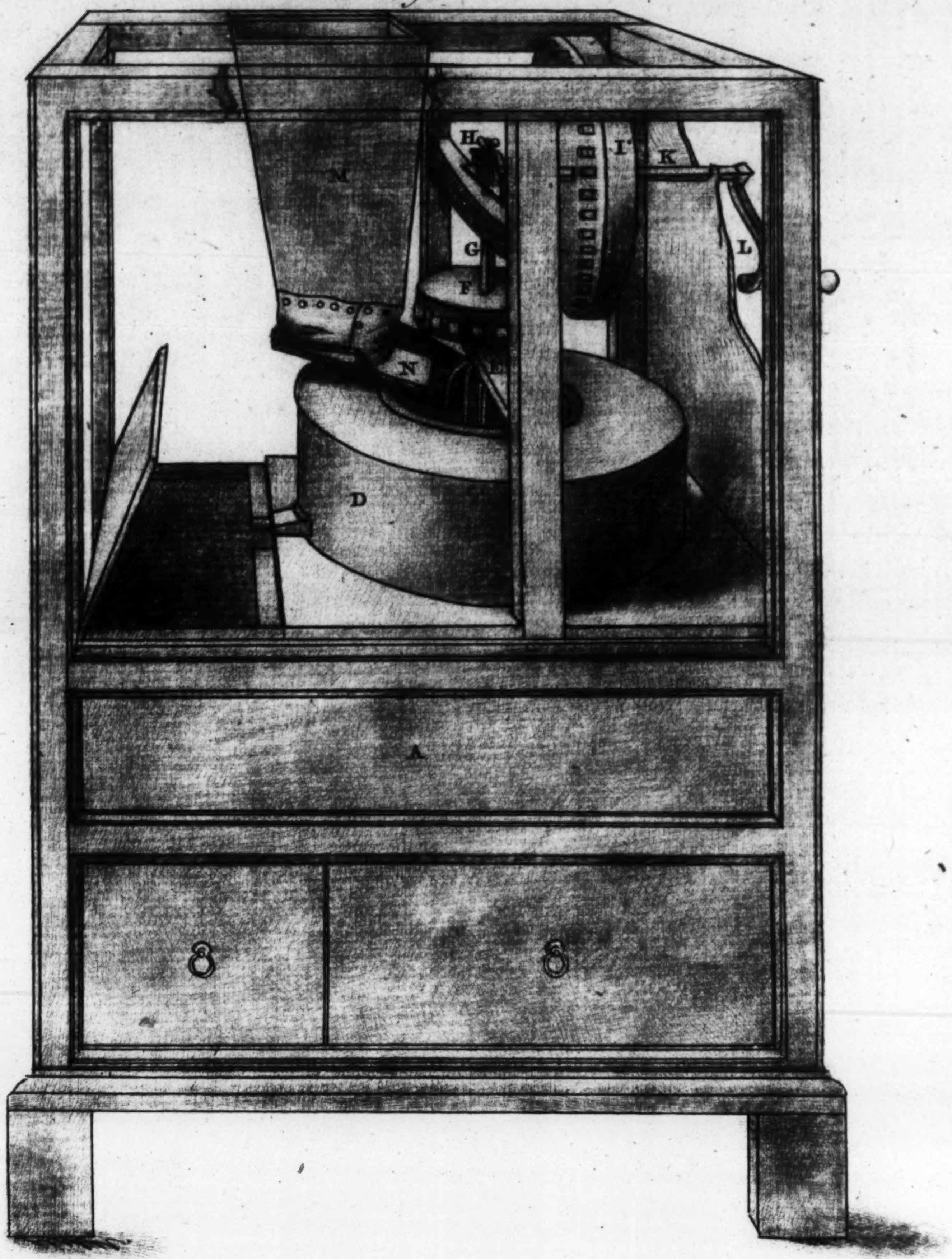
G, The Spindle of the Spur-wheel.

H, The iron Frame, by which the Bruſh is let down to bear on the Sieve, or lifted up from it.

I, The Crown-wheel, which gives motion to the Bruſh C.

K, The

A Front View of Mr. Stedmans Bolting-Mill.
Plate 2. Fig. 3.



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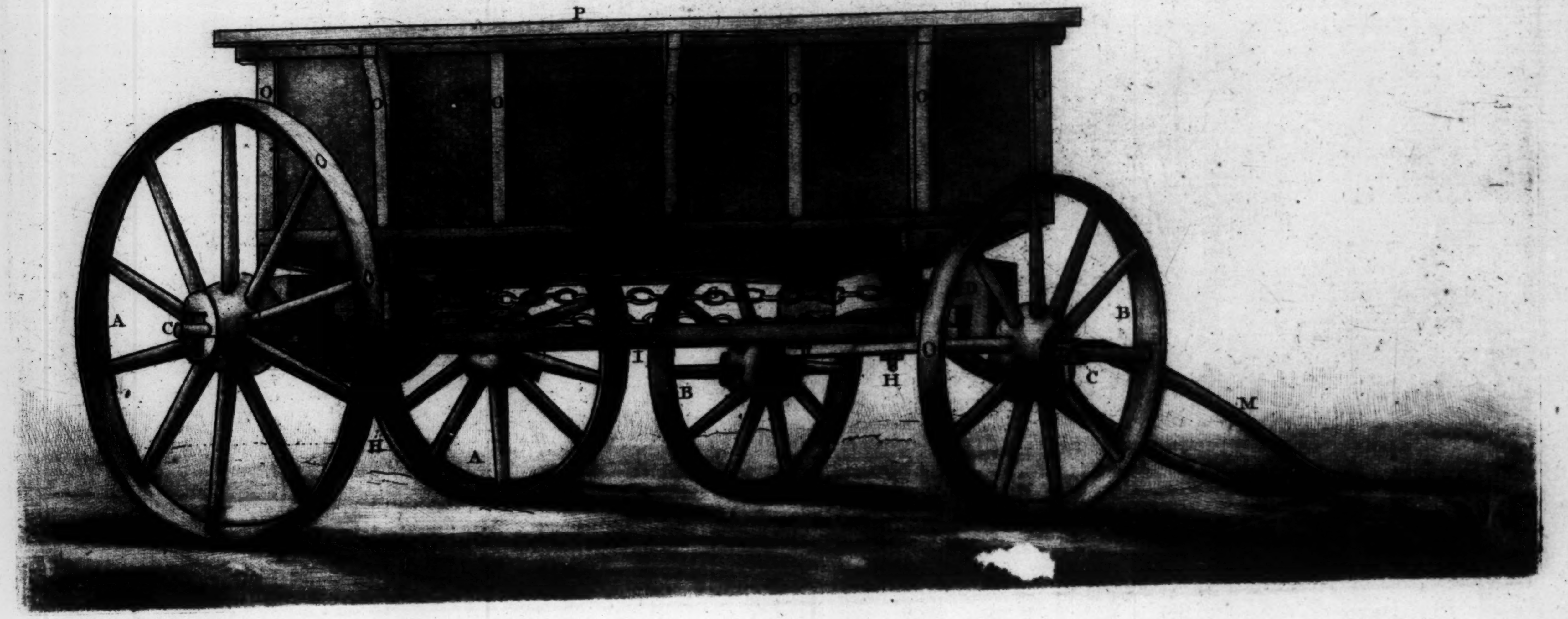
A Perspective View of Mr. William Bayley's Waggon to turn in the least Angle.

Plate 1. Fig. 1.



K, The Spindle of the Crown-wheel.
L, The Winch.
M, The Bin.
N, The Hopper.

FIG. 4.

H, The elevation of the Frame, that carries the Spindle of the Spur-wheel.

The Committee were of opinion that *Mr. Stedman*'s Mill was new, ingenious, and uſeful, and deſerved the encouragement of the Society.

Reſolved to recommend to the Society to give *Mr. Stedman* a bounty of Ten Guineas, and a further ſum of Five Guineas on his delivering to the Regiſter of the Society a Machine more perfect than that under conſideration for the uſe of the Society.

Theſe Reſolutions were agreed to by the Society, *January* 24, 1770.

CHAP. VIII.

A Deſcription of a Model of a FOUR-WHEEL CARRIAGE *to turn in the leaſt Angle*; *by* WILLIAM BAILEY, *junior*.

PLATE I. FIG. 1.

A Perſpective View of the WAGGON.

A, A, THE hind Wheels, five feet diameter, and ſix inches thick, having ten ſpokes: the naves, or nuts of the Wheels, are one foot long, and one foot diameter at their extreme thickneſs.

B, B, The fore Wheels, are three feet ten inches and a half diameter, ſix inches thick, having eight ſpokes: their naves are one foot long, and their extreme diameter one foot.

C, C, The iron Axle-trees; their extreme length is ſeven feet ſix inches; their outer ends, on which the Wheels turn, are one foot ſeven inches long, and their extreme diameter three inches: the inner parts of the axles are three inches ſquare, and are let in fluſh with the under ſurfaces of the bolſters of the Waggon, and faſtened thereto with ſtrong wood-ſcrews. See Plate 2, Fig. 2.

D, D, The two bolſters of the Waggon, are four feet three inches long, one foot deep, and ſix inches thick, the iron axle being let into the under parts of them, having a hole through the middle of the axis and bolſter for the

Pearch-bolt to paſs looſely through; the under end of which has a ſcrew and nut to ſecure it from getting out: in the centre of the ſides of the Bolſters are two mortiſes, cut through them, a foot long, and four inches broad, to receive the ends of the Pearch.

E, A portion of a Wheel or Barrel, ſeven inches diameter, and ſix inches and a half thick, halved into the fore Bolſter three inches and a half from its back ſurface: the upper ſurface of this Wheel, and the Bolſter, to which it is fixed, are parallel to each other.

F, The Barrel of the hind Bolſter, is one foot ſeven inches diameter, and ſix inches and a half thick, and halved into the fore ſide of the hind Bolſter, even with its upper ſurface.

G, A ſtrong iron Chain, which paſſes tranſverſely through the mortiſes at the extremity of the Barrels, and is fixed to the fore ſide of the fore Bolſter, and the hind ſide of the hind Bolſter, thereby joining them together, and cauſing the axles to act in conjunction with each other.

H, H, The Pearch-bolts, on which the axles turn, two feet long, and an inch and a half thick, the under ends of which have ſcrews and nuts as aforementioned.

I, The Pearch, eight feet long, ſix inches broad, and four inches thick: the ends of this Pearch paſs through the mortiſes in the Bolſters, having holes through them for the Bolts to paſs looſely through.

K, K, The end Ribs of the bottom of the Waggon, three feet ſix inches long, ſeven inches and a half broad, and four inches thick: theſe Ribs are fixed to the under ſide of the bottom, twelve inches and a half from their ends.

L, L, The croſs Rib, ſeven feet three inches long, ſeven inches broad, and four thick: theſe Ribs are tenoned into the end Rib, and the bottom of the Waggon is nailed faſt to them.

M, The Thill, made the ſame as thoſe in common uſe. Note, The body of the Waggon is ten feet long, and three feet ſix inches wide.

N, The ſides of the Waggon, are ten feet long, and two feet two inches high.

O, O, O, O, O, O, O, Seven ſide Rails, tenoned into the bottom and the top Rails, and nailed to the ſides of the Waggon. Note, Three of theſe Rails on each ſide are formed like brackets, to ſupport the top frame, or bows of the Waggon.

P, P, The top Rails, or Bows, ten feet ſix inches long, in the form of ladders, one foot three inches and a half broad.

This Model was examined by the Committee of Mechanics, with three other claimants, when the Committee were of opinion that this Model was preferable to the other three.

Reſolved to recommend to the Society to give the whole of the premium of Twenty Guineas to this Candidate; to which reſolution the Society agreed, *January* 1, 1772.

CHAP.

A Plan of Mr. William Bayley's Waggon.

Plate 2. Fig. 2.

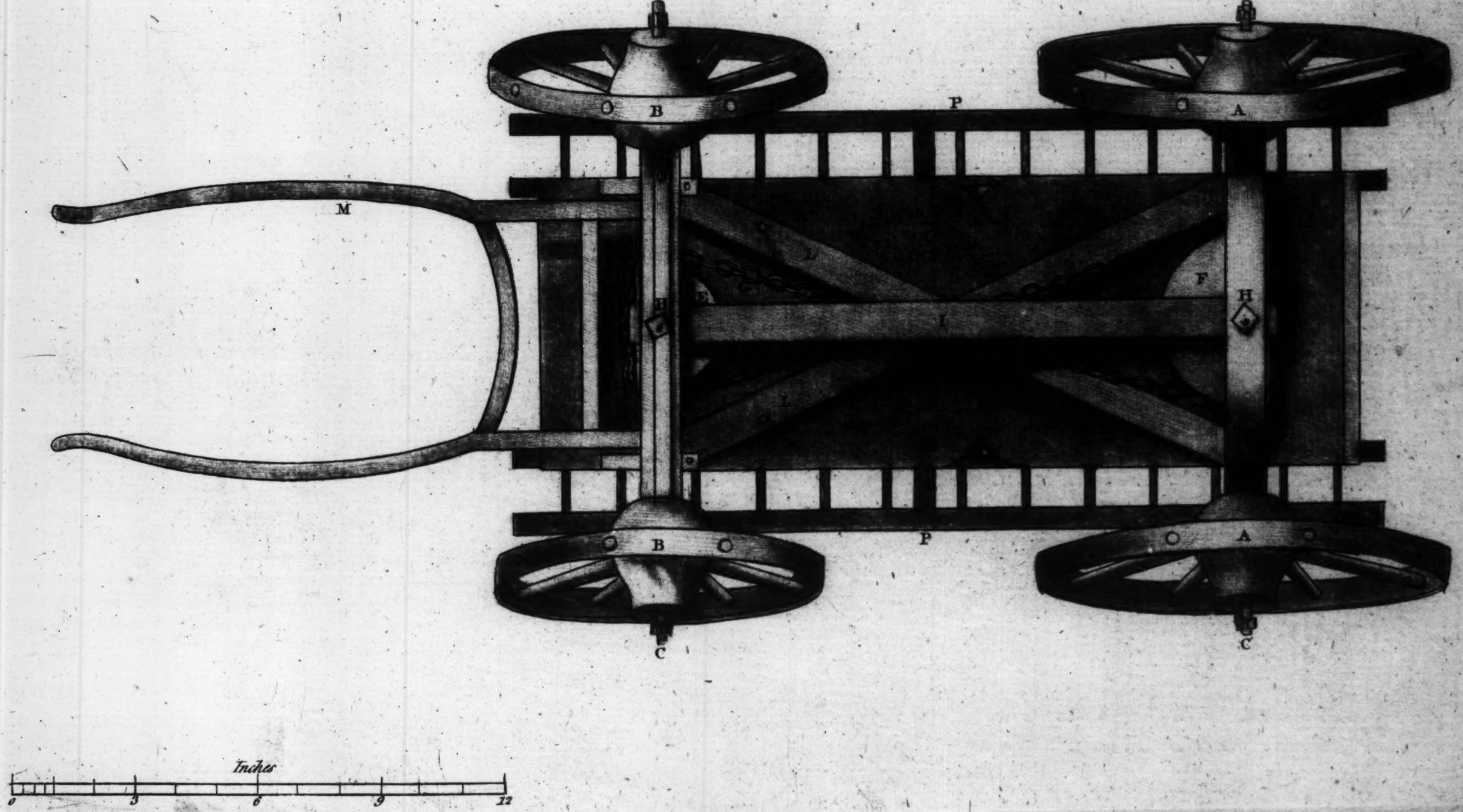


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Fig. 2.

A View of the Harpoon with its Ring at the end.

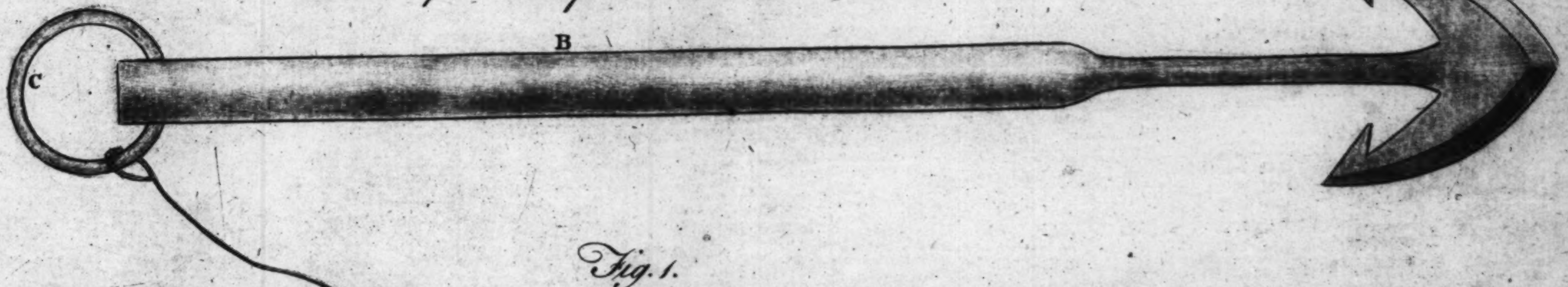
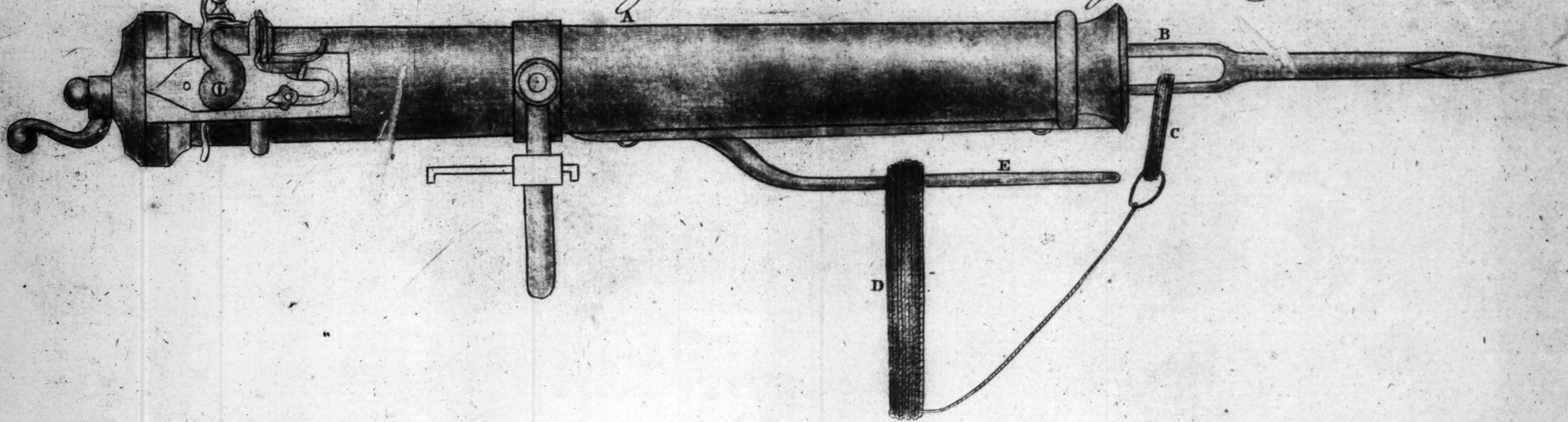


Fig. 1.

A View of the Gun with the Harpoon, and Line in a poſsition for Firing.



C H A P. IX.

A Deſcription of Mr. STAGHOLD's GUN-HARPOON.

F I G. 1.

A, A WROUGHT iron Swivel-gun, with a lock fixed to it: its bore an inch and a half diameter.

B, The Harpoon: its extreme length is three feet; its back end two feet long, and one inch and five twelfths diameter, having a hollow aperture one foot eleven inches and a half long, and half an inch broad, in which the ring ſlides from end to end: its fore end is ten inches and ſeven twelfths long, formed into a ſhank three fourths of an inch diameter; and a barb ſix inches long, and five inches and a half broad, with cutting curved edges.

C, The Wire Ring, to which the Whale-line is ſpliced: this Ring is three inches and a half diameter, conſiſting of ſeven revolutions of neilded iron wire, forming in the whole half an inch diameter, bound about one third of its revolution with waxed cord.

D, A coil of Whale-line, laid on the Traverſe Rod E, to prevent its tangling when the Harpoon is fired off.

E, The Traverſe Rod: this Rod is one foot three inches long, and three fourths of an inch diameter, made very ſmooth, and is welded to a flat iron brace ſcrewed to the under ſurface of the gun.

The Committee of Mechanics made repeated trial of the Gun-harpoons at *Mr. Barnard*'s Yard, and alſo on the River in boats, off the Orchard-houſe near *Blackwall*, in preſence of *Captain Brinkley*, of the *Leviathan* Greenland-ſhip, and *Captain Thew*, of the *Riſing Sun* Greenland-ſhip, who were of opinion, that by this method one fiſh in five would not eſcape being faſtened at a diſtance of fifteen fathoms; whereas by the common method of harpooning there is not on an average more than one throw in twenty that ſecures the fiſh at the diſtance of four fathoms.

The Committee therefore recommended to the Society to provide ſix ſwivel-guns, with locks, and 24 harpoons on *Mr. Staghold*'s conſtruction, for *Captain Brinkley* and *Captain Thew*, who have engaged to make full trial of them the next ſeaſon of the Greenland fiſhery, and give a circumſtantial account of the trials and ſucceſs to the Society.

Reſolved to recommend to the Society to give *Mr. Staghold*, the Inventor, the ſum of Twenty Guineas, for the ſatisfactory trials already made, the Society reſerving to itſelf a further reward when the utility of the invention by actual experiments in the Whale-fiſhery ſhall have been proved.

Theſe Reſolutions of the Committee were agreed to by the Society, *March* 4, 1772.

Note, They alſo gave *Mr. Staghold* a further bounty of Thirty Guineas, *December* 9, 1772.

C H A P. X.

Deſcription of Mr. Arrow's *new-conſtructed* ARCH, *to prevent the fatal Conſequence of Fires.*

PLATE I. FIG. 1.

A Section of a Room, fifteen feet ſquare, cut through the middle to ſhew the thickneſs of the Arch, the ſize of the Butment Courſe, and the iron Clamp that binds the Butment Courſe together, to abate the lateral preſſure of the Arch.

A, THE Centre, to which every joint in the Arch tends: this Center is two feet below the baſement.

B, The Baſement.

C, C, The Butment Courſe, nine feet ſix inches above the baſe line.

D, D, The iron Clamp, let in fluſh with the upper ſurface of the Butment Courſe to bind them together, whereby the latteral preſſure is greatly abated: this Clamp is four inches and a half broad, and one inch and one fourth thick.

E, The Arch, whoſe curve is formed from the centre A.

F, F, The Centers, from which the under curves of the firſt and the Butment Courſes are formed.

PLATE II. FIG. 2.

C, The Butment Courſe.

D, The iron Clamp.

E, The Arch.

G, The Center, to which every joint in the ſide tends, to reſiſt the lateral preſſure.

This Model was examined by the joint Committees of Polite Arts and Mechanics, who were of opinion that the conſtruction of the ſeveral parts, and the particular form of the angle ſtones and joints in this Arch, appears new and ingenious, and contributes greatly to take off the lateral preſſure againſt the ſide walls.

Reſolved to recommend to the Society to give the Gold Medal to *Mr. Arrow*, for his communicating this Arch to the Public.

This Reſolution of the Committee was confirmed by the Society, *October* 14, 1772.

CHAP.

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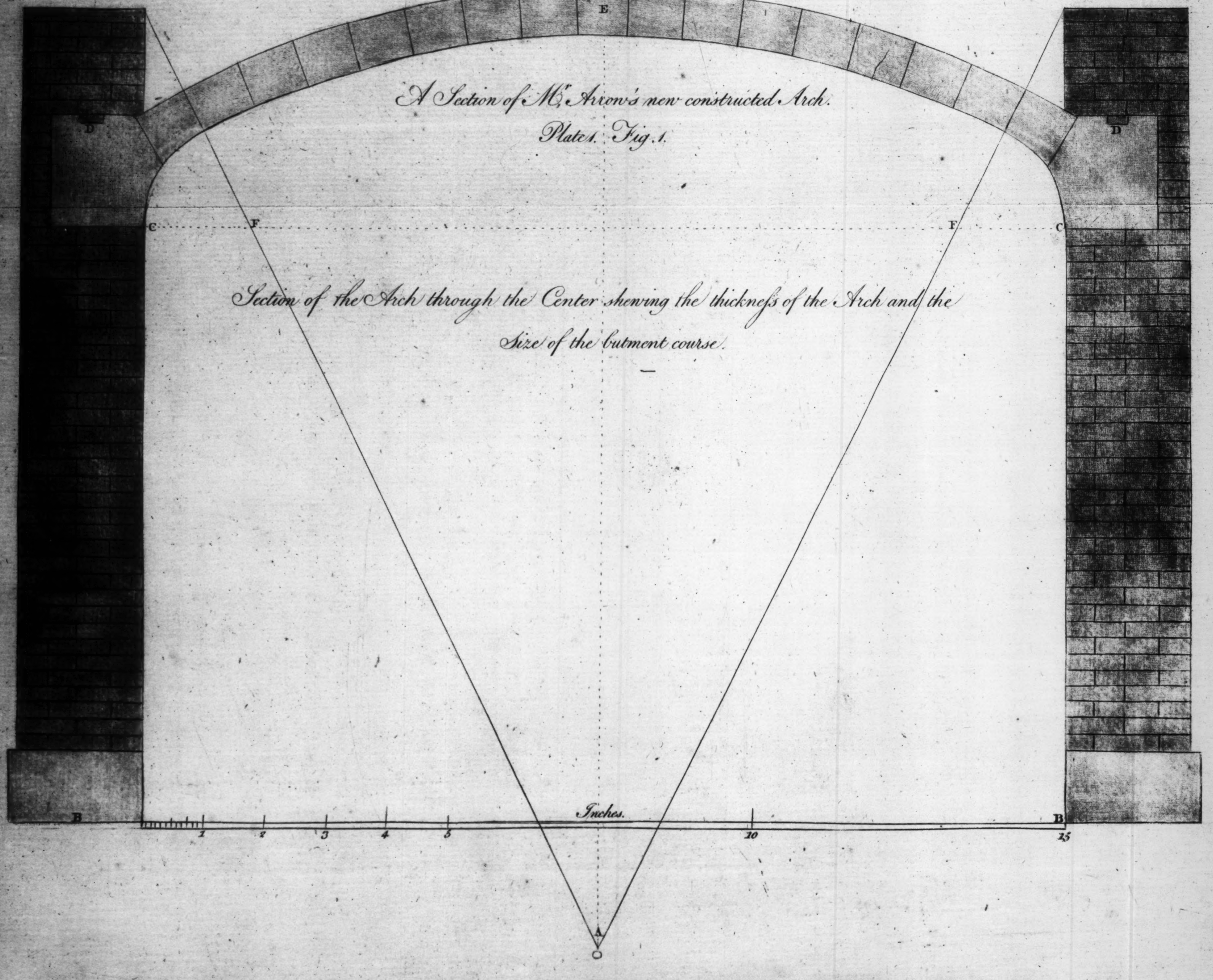

A Section of Mr. Arrow's new constructed Arch.

Plate 1. Fig. 1.

Section of the Arch through the Center shewing the thickneſs of the Arch and the Size of the butment course.

Plate 2d. Fig. 2d.

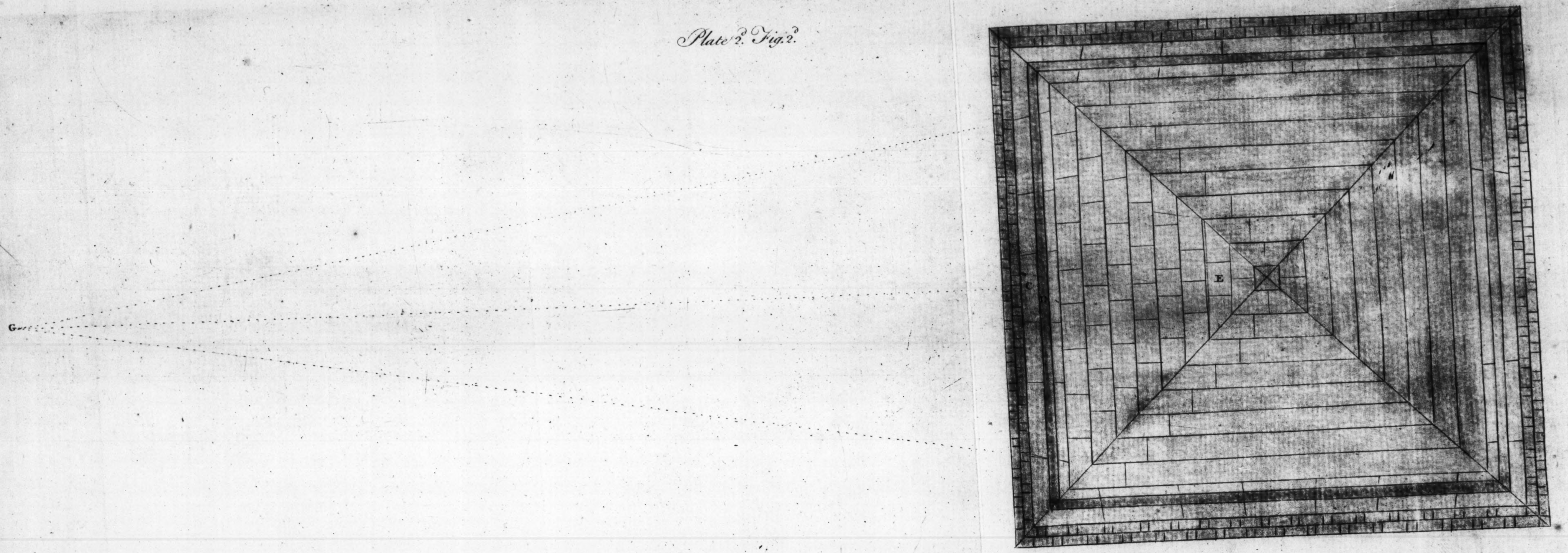

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Plate 1.st of Mr. Hill's Time-piece.

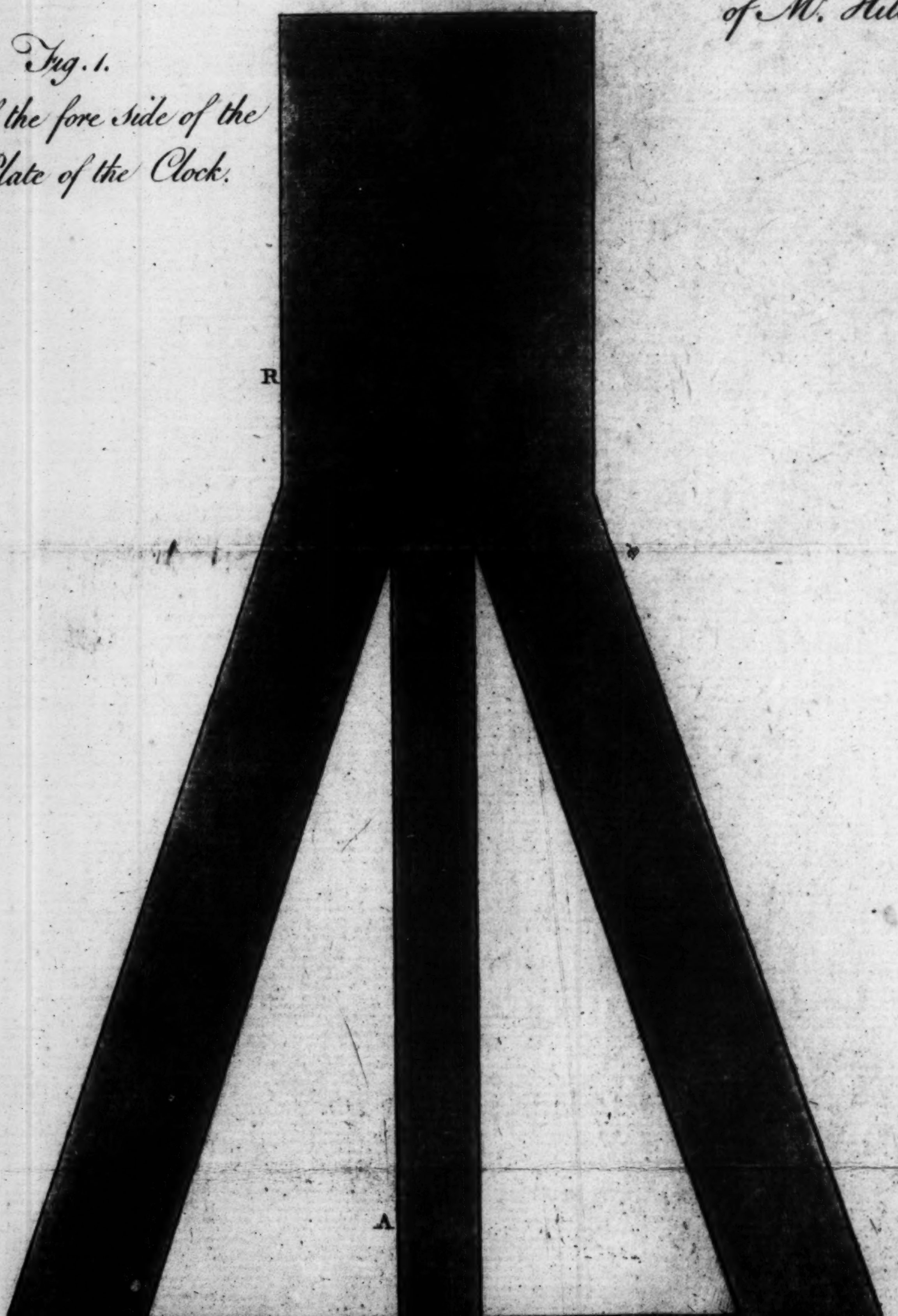


Fig. 1.
Caliper of the fore side of the hind Plate of the Clock.

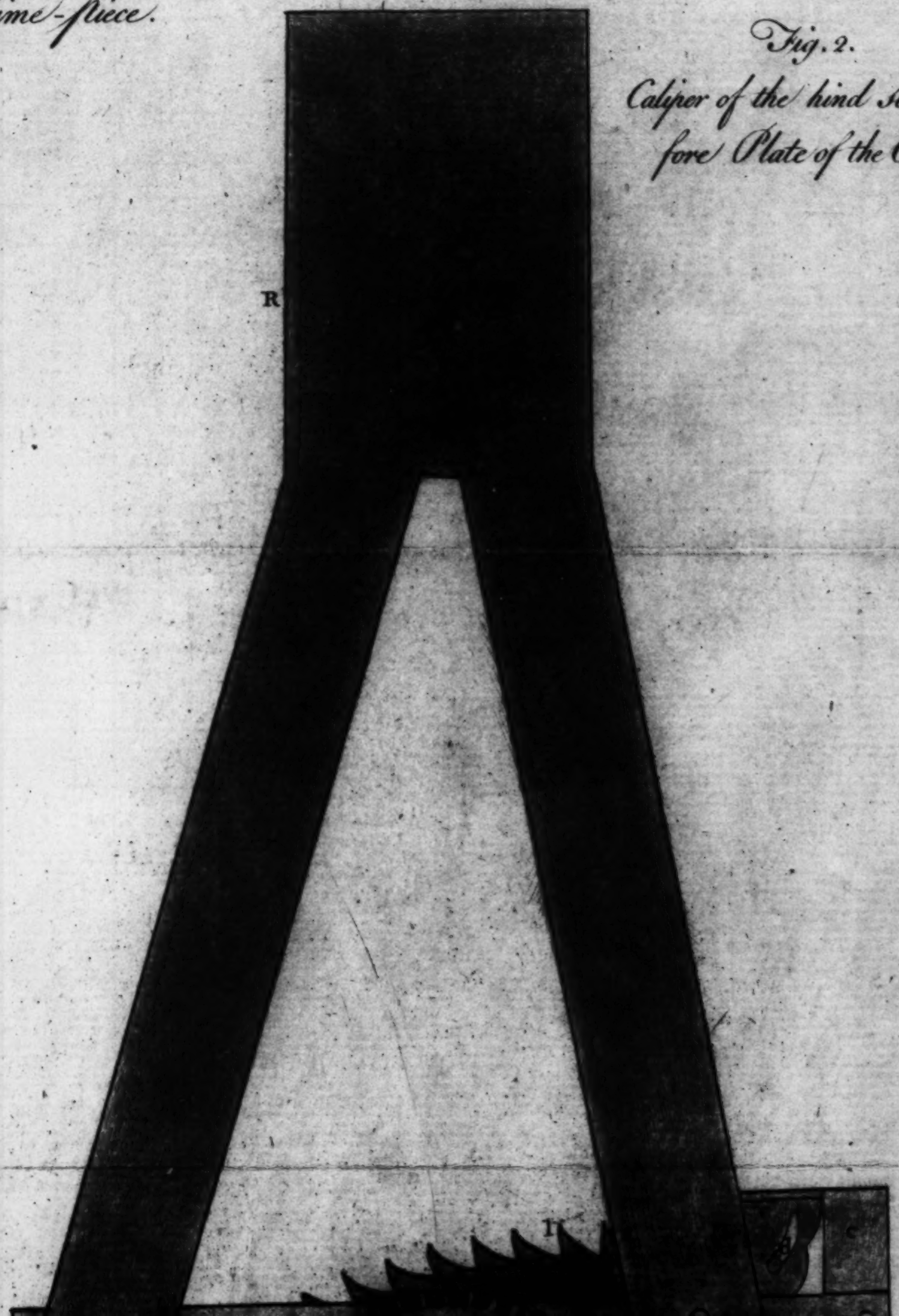
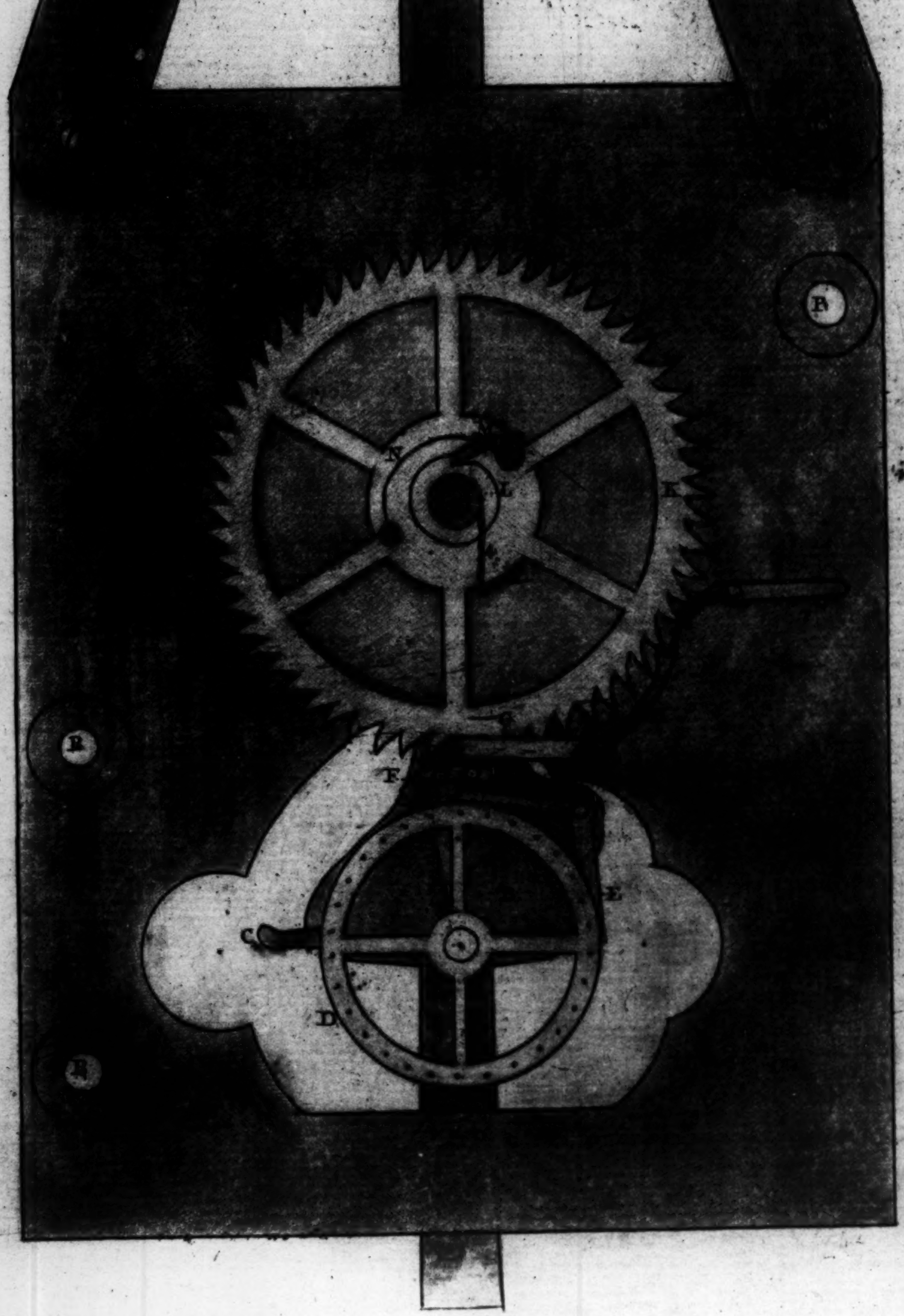


Fig. 2.
Caliper of the hind side of the fore Plate of the Clock.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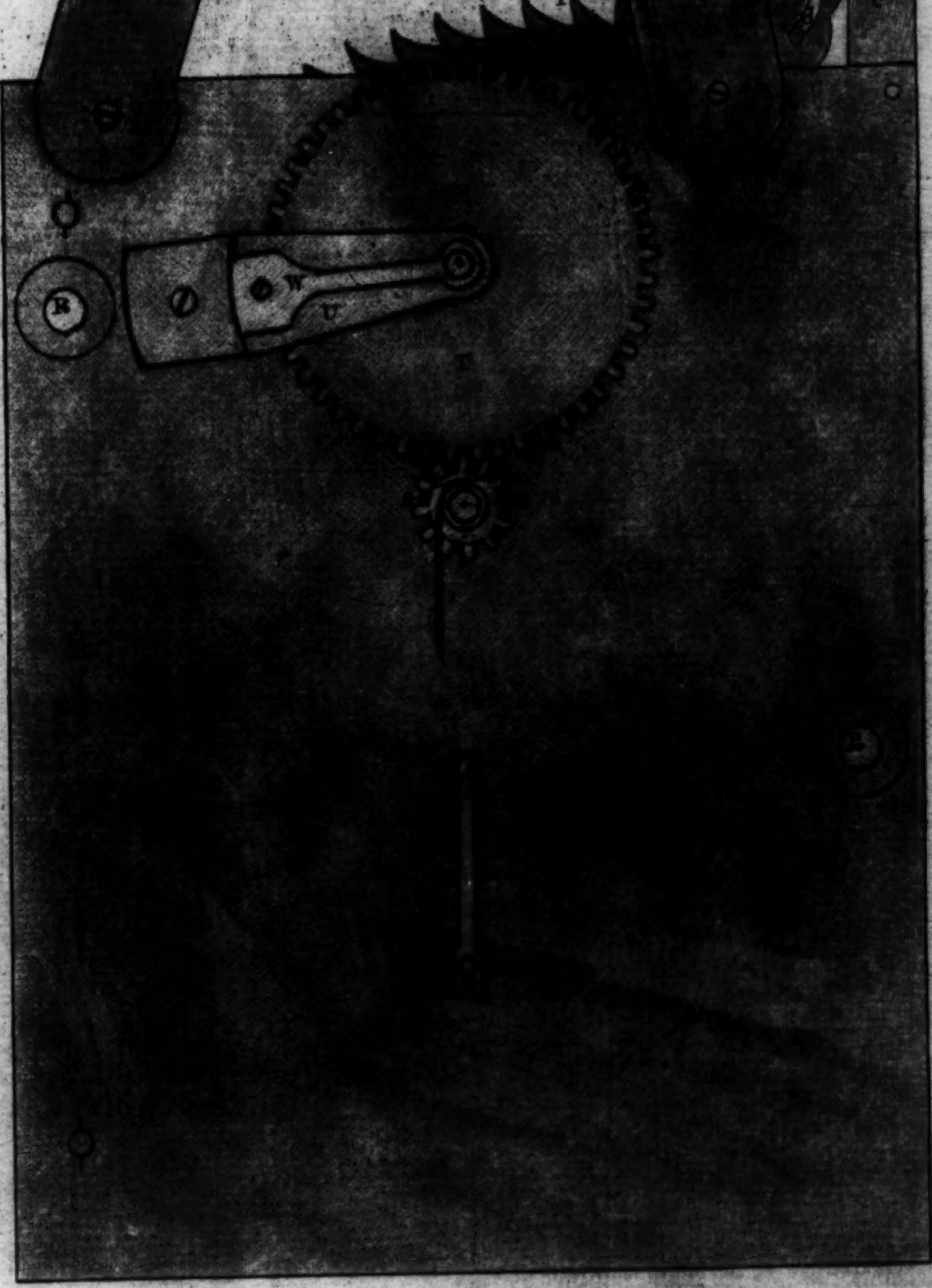
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CHAP. XI.

A Deſcription of Mr. MATTHEW HILL's TIMEPIECE.

PLATE I. FIG. 1.

A, THE Crutch, one foot one inch and a half long, one fourth and three ſixteenths of an inch broad, and three ſixteenths of an inch thick; its under end being flatted to receive the braſs Plate, on which the Pallets, Tumbler, and Click act.

B, The braſs Plate, or bottom of the Crutch: its extreme breadth is one inch and three fourths, one inch and one fourth high, and three eighths of an inch thick.

C, The Pallets: their extreme length is five eighths of an inch, three ſixteenths broad, and one ſixteenth of an inch thick. Note, only one of the Pallets is ſeen in this view.

D, The ſecond, or Swing-wheel, one inch five eighths and one ſixteenth diameter, having thirty pins, or teeth, one of which is made of ſteel wire, and double the length of the others.

E, The Lifting-piece, the upper end of which raiſes the Tumbler F againſt the counterpoiſe by which the Catch H drops from the Wheel K: the Arms of the Lifting-piece are three fourths of an inch long; its under Arm is one eighth of an inch broad, the upper Arm one twelfth of an inch broad, and turning on a Stud in the braſs Plate B.

F, The Tumbler, which acts on a Stud in the braſs Plate B: its extreme length is five twelfths of an inch; its breadth one eighth of an inch, and one twelfth of an inch thick; the Stud, on which it turns, is placed one eighth of an inch from its outer end: it has another Stud or Pin fixed in the Tumbler, one eighth of an inch from its inner end: its uſe is to lift the Counterpoiſe G, and riſe into the teeth of the Hour or Centre Wheel K: at the outer end of the Tumbler is fixed a ſmall ſpring, the under end of which, bearing againſt a pin in the braſs Plate B, at the time the inner ſtud is in the teeth of the Hour-wheel, ſerves to facilitate the return of the Tumbler, as ſoon as it has paſſed the Counterpoiſe.

G, The Counterpoiſe: its extreme length is ſeven eighths of an inch; its breadth one eighth, and one twelfth of an inch thick: this Counterpoiſe turns freely on a ſtud at its outer end, fixed in the Plate Q; the inner end is rounded off from its under edge. See another view of the Counterpoiſe. Plate 3, Fig. 9.

H, The Catch of the Centre-wheel: it turns on the ſame ſtud as the Counterpoiſe G, its under end being notched, to fall in contact with the end of the Counterpoiſe. See Plate 3, Fig. 8.

I, The Catch, that ſtops the Center-wheel from turning backward, while the weight is winding up: this Catch turns on a ſcrew, fixed in the braſs Plate Q, the back end of it reſting on a pin fixed in the ſaid Plate.

K, The Centre-wheel, is three inches and one eighth diameter, having ſixty teeth: this Wheel is rivetted on the back end of the Arbor O.

L, The Barrel and Ratchet, on which the gut or line of the weight is wound.

M, A Catch, acting on a ſcrew in the ſide of the Center-wheel, its fore end bearing againſt the tooth of the Barrel-ratchet.

N, The Spring that preſſes the Catch M againſt the Ratchet.

O, The Arbor of the Centre-wheel, on which the Barrel L turns, and on the fore end of which the Minute-hand is fixed. See Plate 3, Fig. 3.

P, P, P, The Pillars, with which the fore and back Plates are framed together. See Plate 3, Fig. 3.

Q, Q, The frame Plates of the Clock, ſix inches and three fourths high, five inches and one eighth broad, and one eighth of an inch thick.

R, The iron Frame, to raiſe the pendulum; its height from the upper edge of the Plates is ſeven inches and a half; the under ends of the Frame are ſcrewed to the upper parts and inner ſides of the Plates, to ſupport the crutch and pendulum.

FIG. 2.

S, A braſs Nut, five eighths of an inch diameter, having twelve teeth: this Nut is rivetted on the fore end of the Barrel L; it is connected to the Wheel T, by which the weight is wound up.

T, The wind-up Wheel, two inches and one fourth diameter, having forty-eight teeth; its fore pivot turns in the braſs Plate Q, and the back pivot in the Cock U.

U, The braſs Cock, that ſupports the back pivot of the wind-up Wheel.

W, A braſs Spring, fixed on the back of the Cock U, its fore end bearing againſt the end of the pivot of the Wheel T.

u, A Spring, fixed againſt the inner ſide of the fore Plate Q, its under end bearing againſt the ſhoulder of the Swing-wheel's Arbor, to prevent it from vibrating.

c, c, The ſides of the braſs Cock, that ſupport one end of the Hammer's Arbor; it is ſcrewed againſt the upper end and fore ſide of the fore Plate, is bent flat on the upper part half an inch broad, then turned down perpendicular, to receive the pivot of the Hammer Arbor in a curved mortiſe.

d, The curved Mortiſe, in which the outer pivot of the Hammer Arbor riſes and falls, when the Rack (l) is lifted.

h, The Line, or Gut, wound on the Barrel L, to carry the weight.

L, The Barrel. See Fig. 1, and 3.

l, The Rack. See Plate 2, Fig. 4.

PLATE II. FIG. 3.

A, The Crutch. See Plate 1, Fig. 1.

B, The braſs Plate, to which the Pallets, &c. are fixed. See Plate 1, Fig. 1.

Plate 2.
of Mr. Hills Time-piece.

Fig. 3.

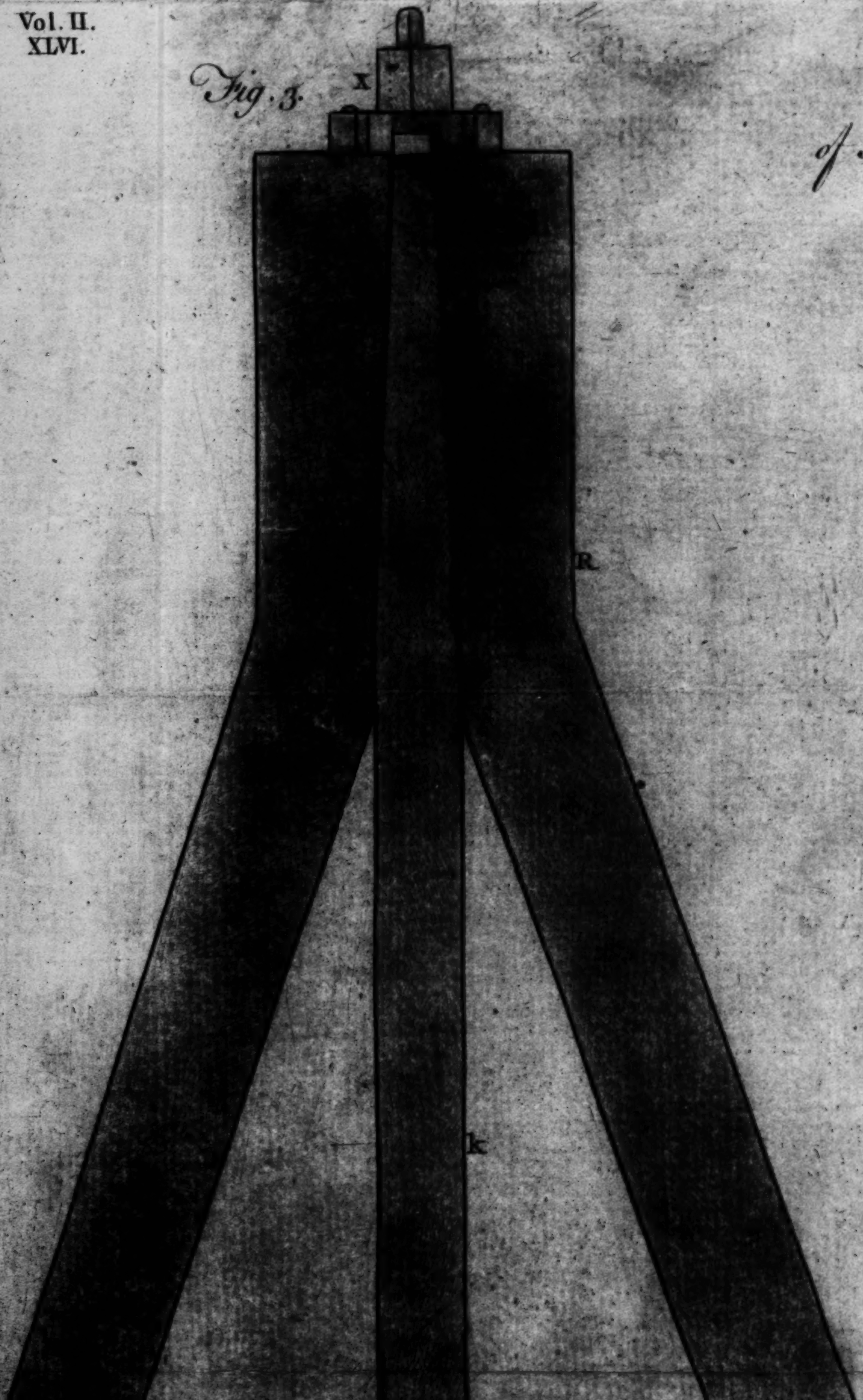
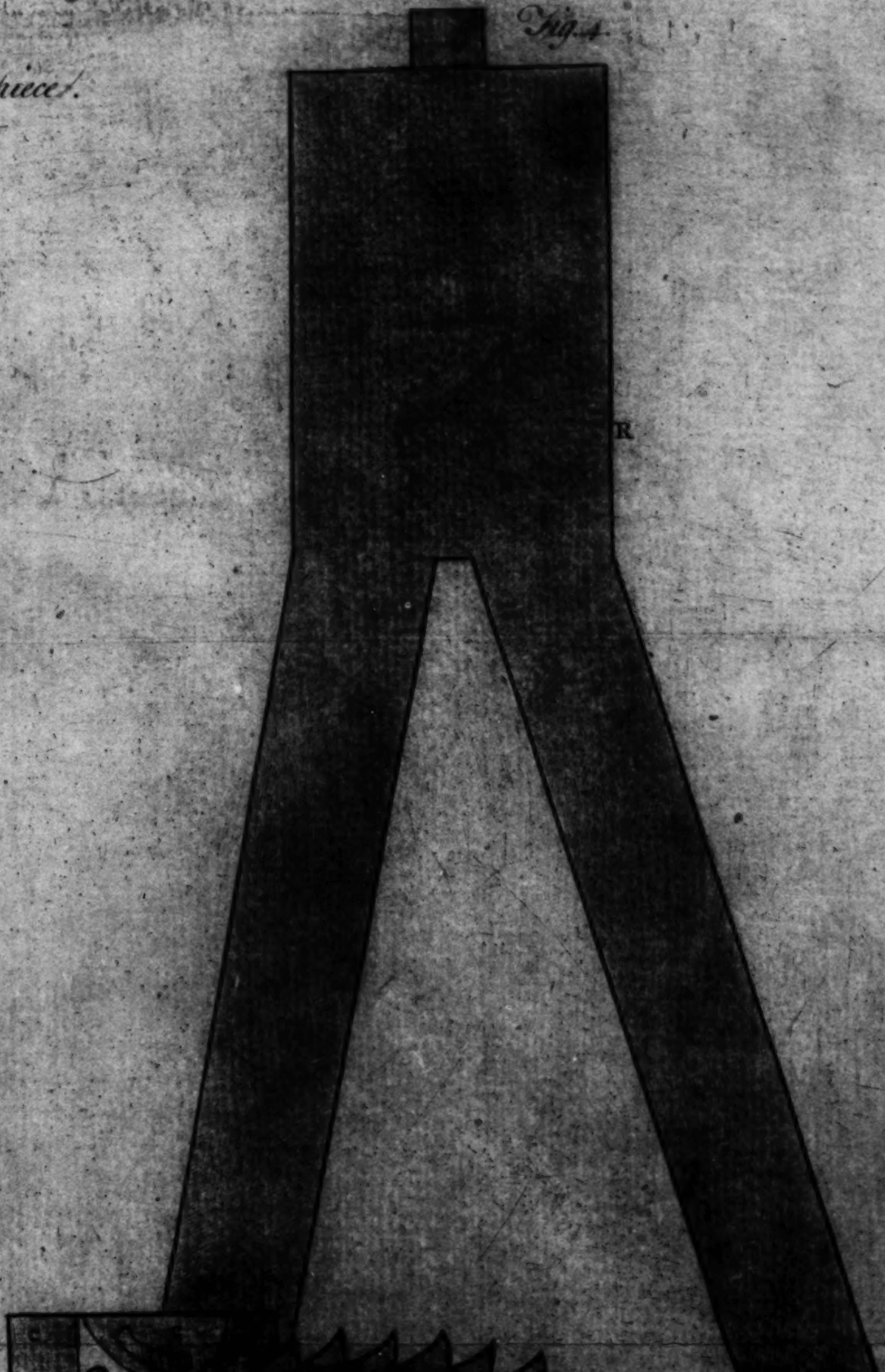
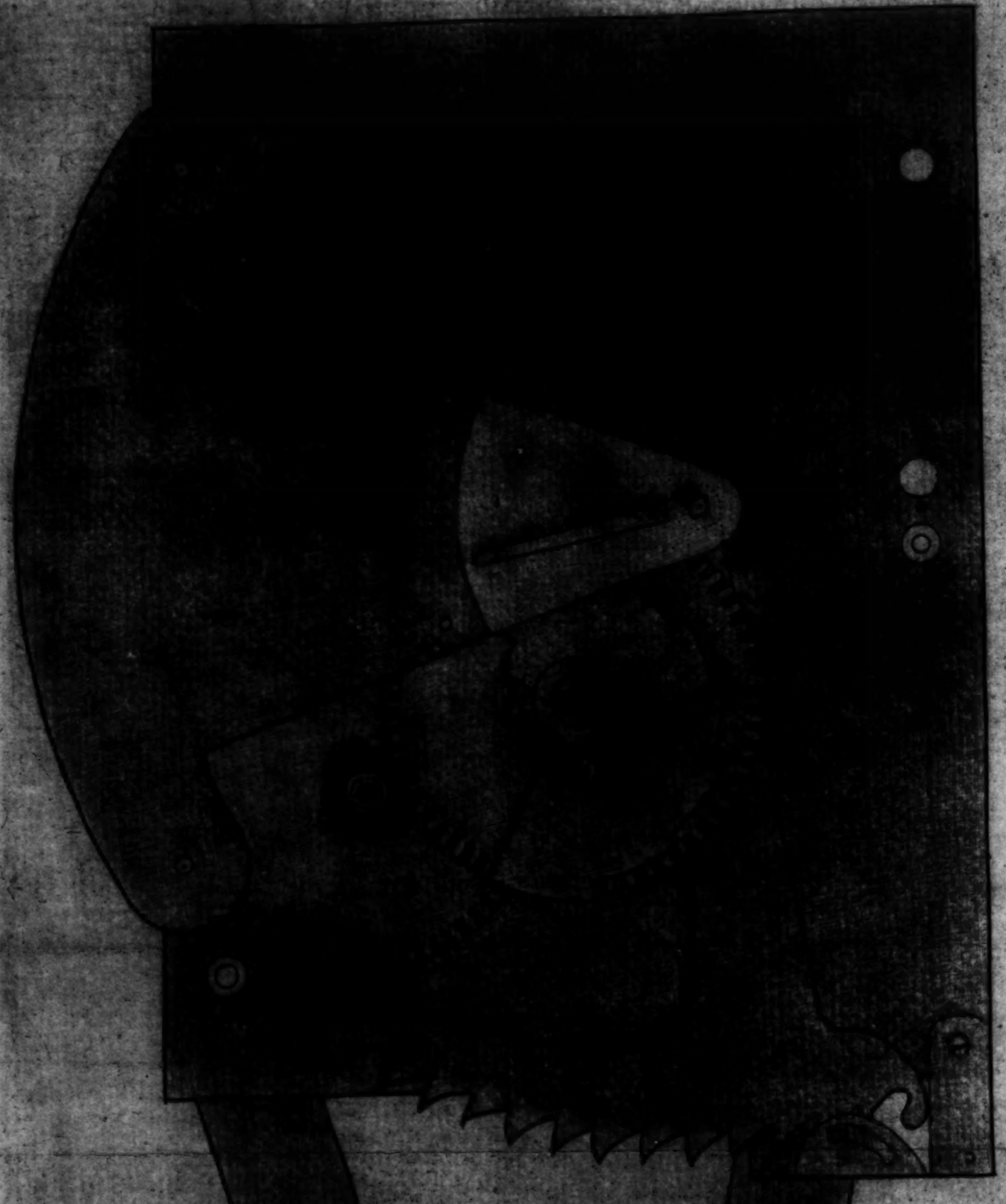
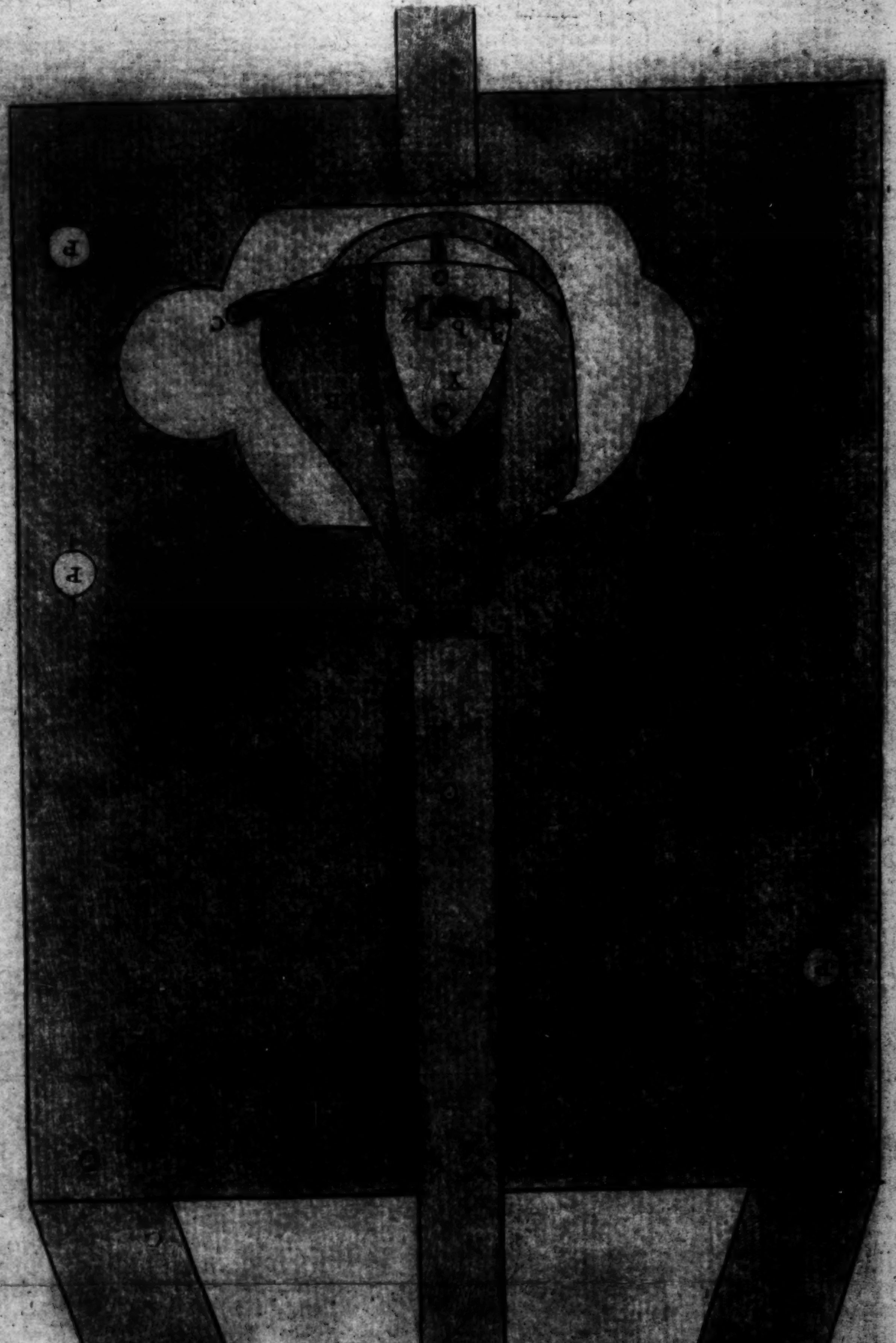


Fig. 4.



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P
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C, Part of one of the Pallets. See Plate 1, Fig. 1, and Plate 3, Fig. 6 and 7.

Q, The hind ſide of the back Plate.

R, The iron Frame, that ſupports the Crutch A, and Pendulum K.

X, A braſs Cock, by which the Pendulum is ſuſpended, and the ſpindle of the Crutch ſupported.

Y, A braſs Plate, faſtened with a ſcrew to the hind ſide and under end of the Crutch.

Z, A Stud, fixed in the braſs Plate Y, to receive the ſpindle of the Screw h.

a, A Stud, which, paſſing looſely through the curved mortiſe in the braſs Plate Y, is fixed to the Crutch A.

b, A ſmall Screw, which paſſes through a female ſcrew in the head of the Stud a: the end or pivot of the Screw paſſes looſely through the Stud Z, and is rivetted behind it: its uſe is to bring the Crutch and Pendulum to their proper beat.

c, c, The ſides of the braſs Cock, that ſupport the fore end of the Hammer-arbor. See Plate 1, Fig. 2, and Plate 3, Fig. 5.

An iron Pin, an inch long, fixed in the braſs Plate Y, and paſſes through a mortiſe in the Pendulum to give it motion.

PLATE II. FIG. 4.

Q, A braſs Plate. See Plate 3, Fig. 5.

R, The iron Frame, that ſupports the Crutch and Pendulum. See Plate 3, Fig. 5.

c, The Cock, that ſupports the fore ſpindle of the Hammer's axis. See Plate 1, Fig. 2, and Plate 3, Fig. 5.

l, The Rack, whoſe radius is four inches and one twelfth; its portion of a circle three inches and ten twelfths, having twelve teeth: its thickneſs is one eighth of an inch.

m, The Cannon-pinion, three fourths of an inch diameter, having twenty leaves: it is fixed on the axis of the Minute-hand, cloſe to the fore ſide of the Plate 9.

n, The Cock, that ſupports the fore end of the axis of the Centre and Hour Wheels, repreſented by occult lines.

o, The Minute-wheel, two inches and three ſixteenths diameter, having ſixty teeth, and is actuated by the Cannon-pinion m.

p, A Pinion, fixed on the collet of the Minute-wheel, five eighths of an inch diameter, having fifteen leaves, by which the Hour-wheel is actuated.

q, The Hour-wheel, two inches and a half diameter, having ſixty teeth: this Wheel is fixed on a collet, which turns on the arbor of the centre-wheel, outſide the braſs Cock n.

r, The Snail, whoſe extreme radius is one inch and three ſixteenths, having twelve notches againſt the ſtud of the Rack-arm, or weights, riſes to regulate the number of ſtrokes: this Snail is fixed on the collet of the Hour-wheel, one fourth of an inch before the wheel.

s, The Rack-arm, or Weight, which gives motion to the Rack and Hammer: this Arm, or Weight, is fixed on the ſame Arbor as the Rack; the inner end of it is braſs, its outer end lead, riveted to the braſs of a ſufficient weight to actuate the Rack and Hammer.

t, A Spring, fixed to the Rack-arm, one fourth of an inch from the centre of its axis; at the other end of the ſpring is rivetted a Stud, which, paſſing looſely through a hole in the braſs part of the Arm, riſes againſt the edge of the Snail.

PLATE III. FIG. 5.

A, The Crutch, whoſe axis turns in the Cocks X, X.

B, The braſs Plate at the bottom of the Crutch, to which the Pallets are fixed.

D, The Swing-wheel.

K, The Centre-wheel.

L, The Barrel and Ratchet. See Plate 1, Fig. 1.

P, P, P, The Pillars of the Clock-frame.

Q, Q, The Plates.

R, The iron Frame, that ſupports the Crutch and Pendulum.

S, The Pinion, by which the Weight is wound up. See Plate 1, Fig. 2.

T, The wind-up Wheel. See Plate 1, Fig. 2.

U, The Cock, that ſupports the axis of the wind-up Wheel.

X, X, The Cocks, that ſupports the axis of the Crutch, and to which the Pendulum is ſuſpended: theſe Cocks are two inches and three fourths long, and four twelfths of an inch thick.

Y, The braſs Plate, at the hind ſide of the Crutch, to which the Stud is fixed that gives motion to the Pendulum.

a, A Stud, that, paſſing through a mortiſe in the braſs Plate Y, is fixed on the bottom of the Crutch, to receive the Screw b. See Plate 2, Fig. 3.

c, The Cock, that ſupports the fore end of the Hammer-arbor.

d, The Hammer-arbor.

e, The Shank of the Hammer, the upper end of which turns on a joint. See Fig. 10.

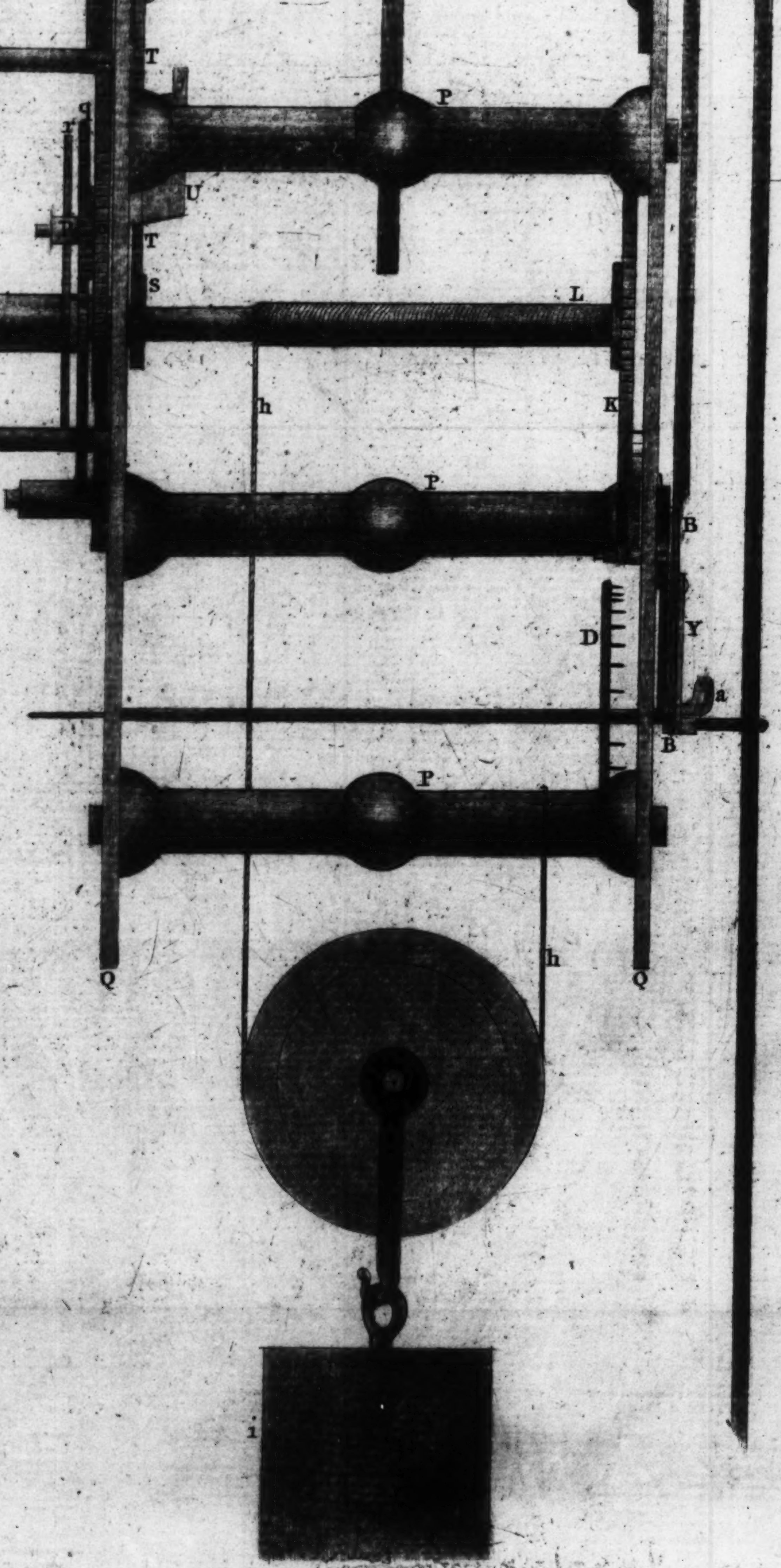
f, The Head of the Hammer.

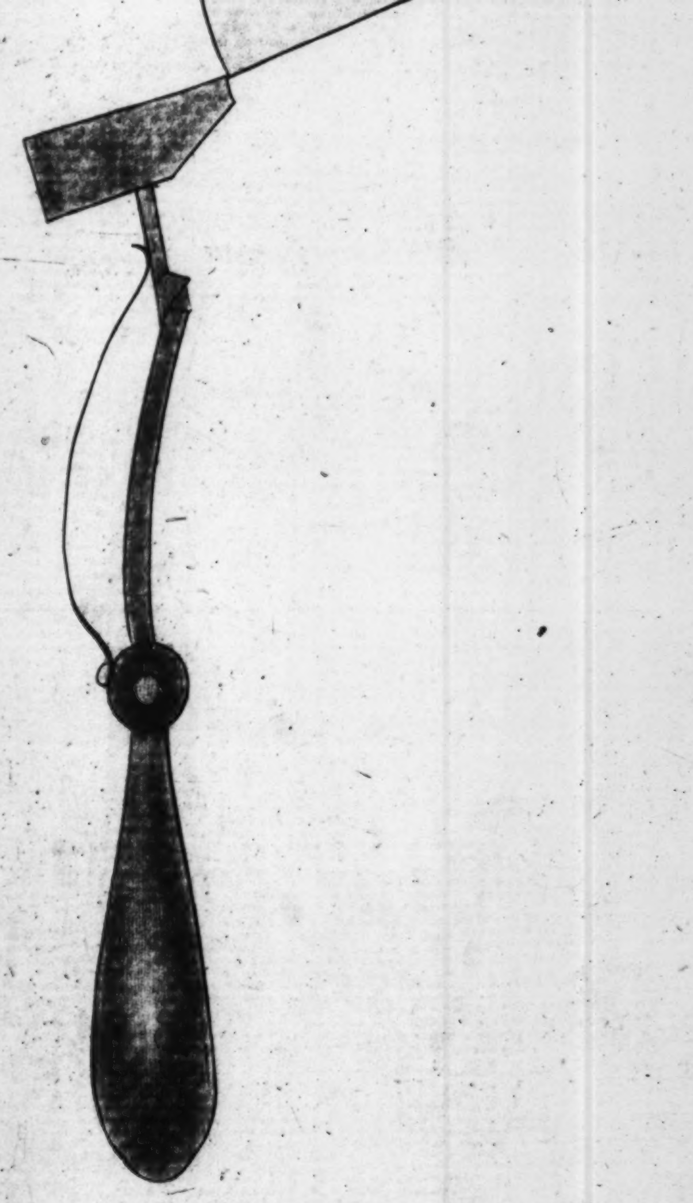
g, The Spring of the Hammer: its under end is ſcrewed to the Shank near its Arbor, the upper end of it bearing againſt the upper part of the Shank, a little above the joint, to preſs it forward, and, when the Hammer touches the Bell, gives way for it to paſs by it.

h, The Line, or Gut, that carries the weight: one end of it is faſtened to the Pillar P, and the other to the Barrel L.

i, The Weight and Pulley: the Weight is two inches and a half long, and an inch and a half diameter, weighing one pound and ten ounces.

k, The Pendulum: its Rod is three feet ſeven inches long from the under edge of the Cock X to the bottom of the Bob; ſeven twelfths of an inch broad, and one twelfth of an inch thick, having a mortiſe through it an inch long, to receive the Stud in the bottom of the Crutch.





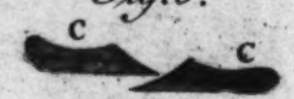


Fig. 6.

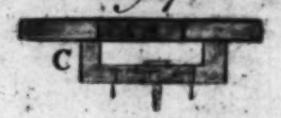


Fig. 7.

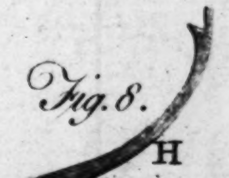


Fig. 8.

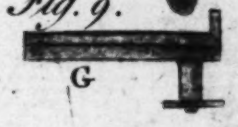


Fig. 9.

Plate. 3.

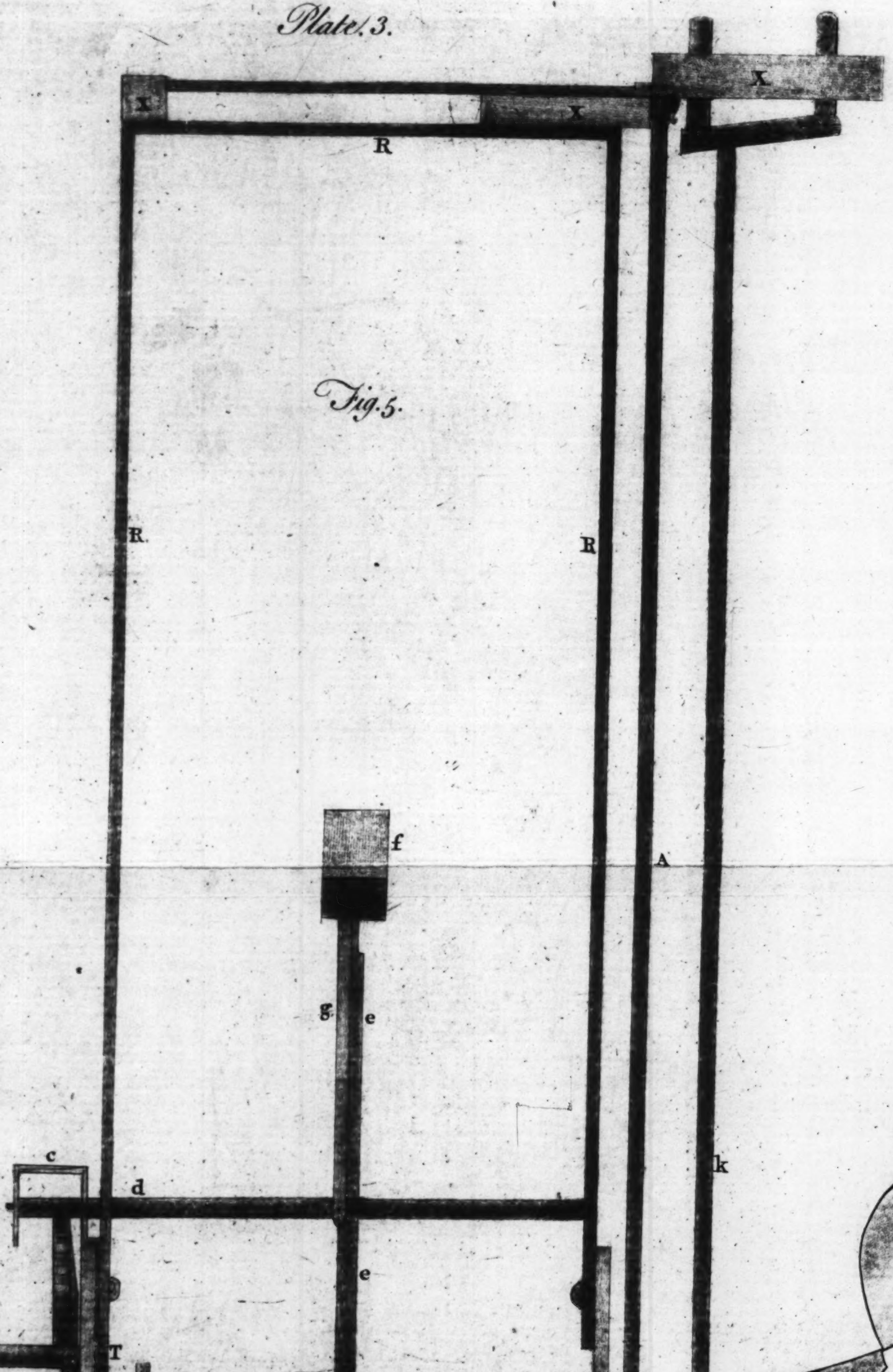


Fig. 5.

Fig. 10.

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F I G. 6.

C, C, The ſides of the Pallets.

F I G. 7.

C, The upper ſurface of the Pallets.

F I G. 8.

H, The Catch, that prevents the Centre-wheel from moving round till the expiration of a minute, when it is diſcharged from the wheel, while it moves one tooth.

F I G. 9.

G, The upper ſurface of the Counterpoiſe.

F I G. 10.

The Side View of the HAMMER-SPRING, *&c.*

d,	The Arbor.
e,	The Shank.
f,	The Head of the Hammer.
g,	The Spring.

The Committee examined this Clock, and were of opinion that it was intirely new, and ingenious in its conſtruction; as it conſiſts of much fewer parts than thoſe in common uſe.

Reſolved that, as this Clock requires leſs oil, it will be longer without growing foul, or having its motion impeded, than in common Clocks; and that there are ſeveral parts in the conſtruction (particularly the repeating part) which may be of great utility, and applicable to many purpoſes.

Reſolved *Mr. Hill* is deſerving of a bounty from the Society.

Reſolved to recommend to the Society to give *Mr. Hill* a bounty of Fifty Guineas, he leaving the Clock with the Society for the uſe of the Public.

Theſe Reſolutions of the Committee were agreed to by the Society, *May* 19, 1773.

CHAP. XII.

A Deſcription of Mr. Gascoigne's **FALLING HINGE**, *taken in its full Dimenſions.*

FIG. 1.

A, THE ſide of the upper Hinge, that is to be fixed to the Door-poſt: it is five inches and three fourths long; its extreme breadth is two inches, and one fourth and one ſixteenth thick. See A Fig. 3.

FIG. 2.

B, The ſide of the upper Hinge, that is fixed on the edge of the Door, is five inches and five twelfths long, one inch and five twelfths broad, and one fourth of an inch thick, having on one ſide a curved arm, through the centre of which the Pin C paſſes for it to turn on. See Fig. 3.

FIG. 3.

An End View of the upper Hinge *put together.*

A, The Side, that is to be fixed to the Door-poſt.
B, The Side, that is to be fixed to the edge of the Door.
C, The Joint or Centre, on which it turns.

FIG. 4.

D, The upper part of the under Hinge, which is to be fixed at the bottom of the Door-poſt: its extreme length is five inches and ſeven twelfths; its extreme breadth is two inches one fourth, and one twenty-fourth of an inch thick.

E, The centre Pin of the under Hinge.

FIG. 5.

F, The lower part of the under Hinge, which is to be fixed to the bottom of the door: it is four inches and one twelfth long, one inch and five twelfths broad, and one fourth of an inch thick, its under end forming a ſegment of a circle, to receive the Friction-roller H, and is covered with a braſs Plate, the under

Mr. Gascoignes Door Hinge.

Fig. 1.

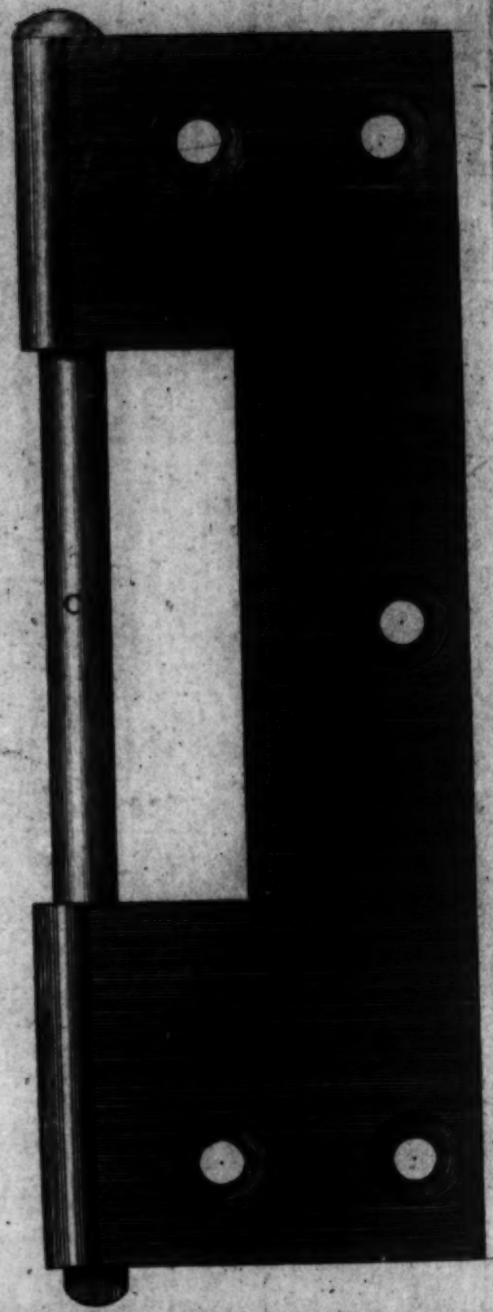


Fig. 2.

Fig. 3.

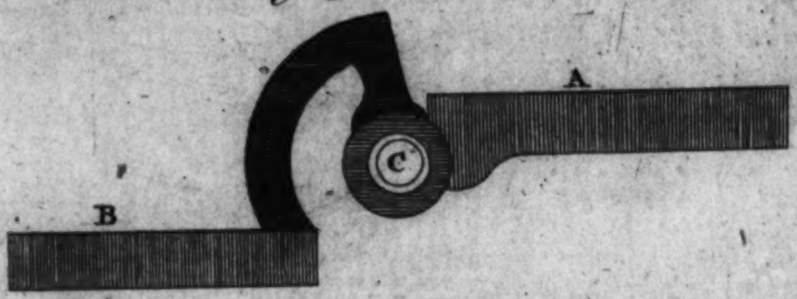


Fig. 4.

Fig. 5.

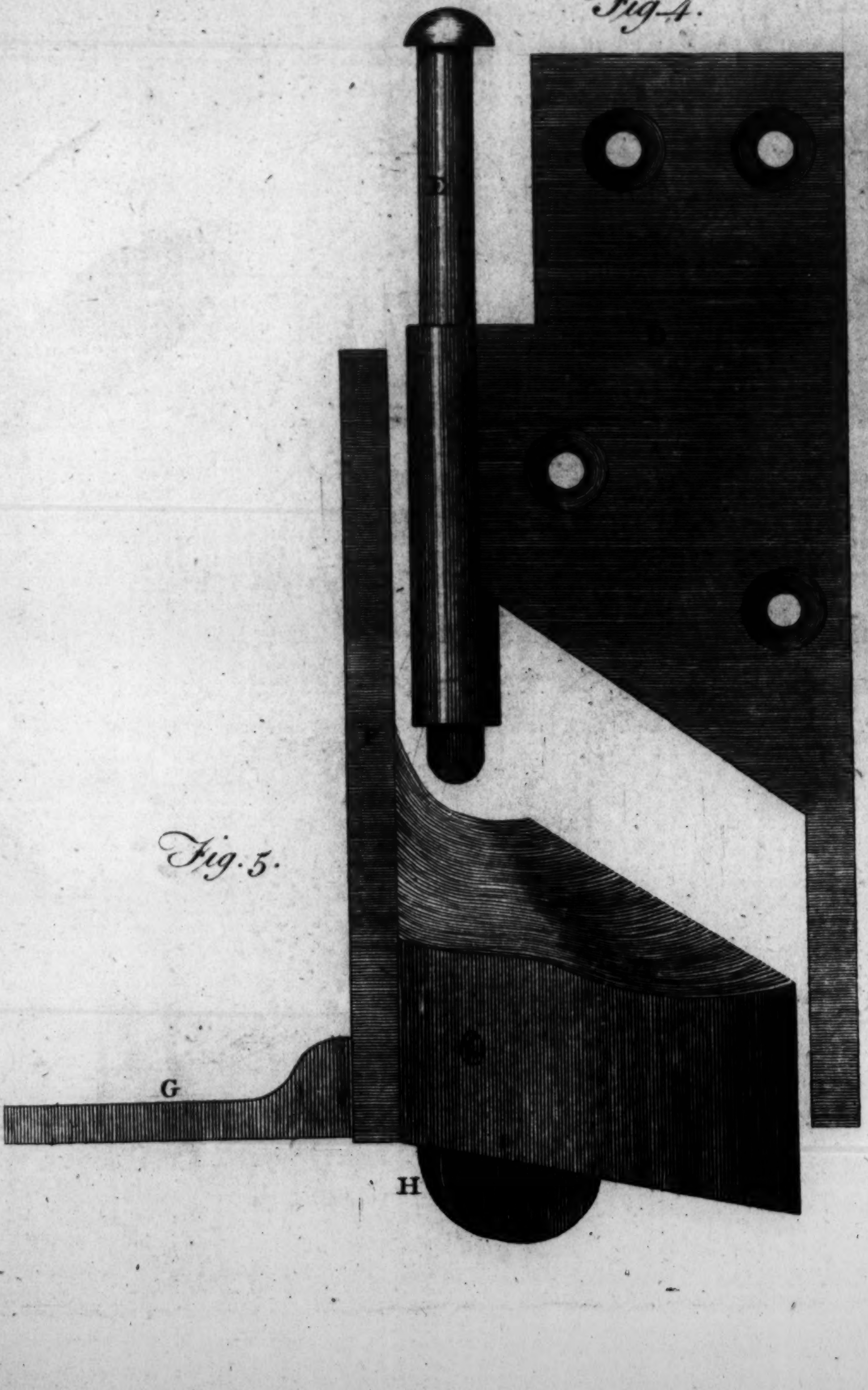


Fig. 7.

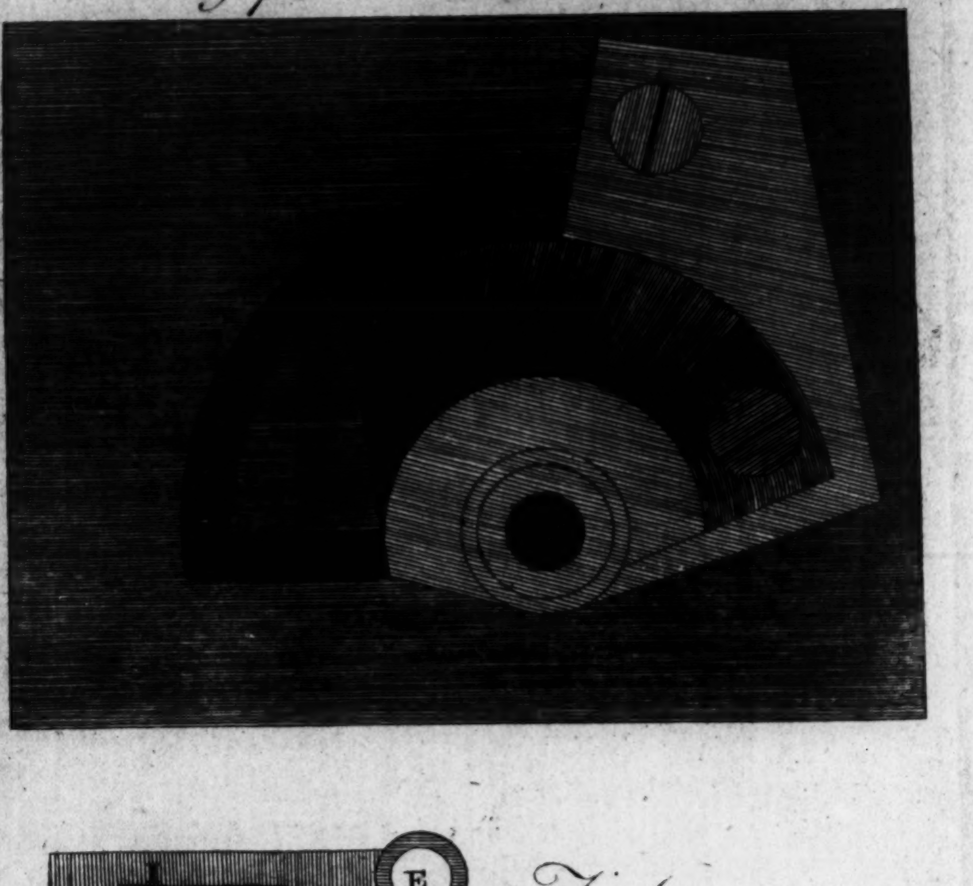
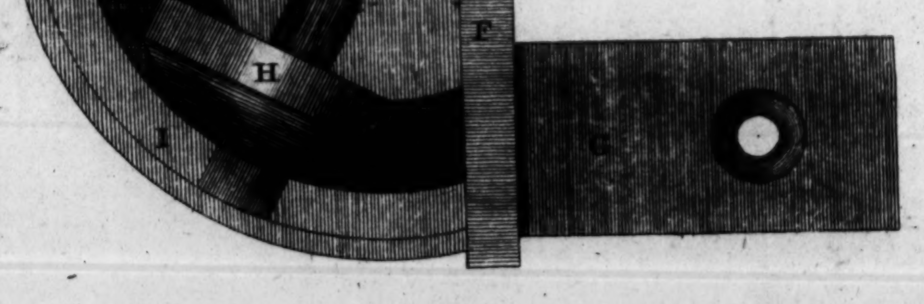


Fig. 6.



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der end of which is a portion of a cylinder, and its upper part of a cone, to act againſt the under edge of the Plate D.

G, An iron Arm, one inch and three fourths long, ſeven eighths of an inch broad, and its extreme thickneſs half an inch: this Arm is rivetted to the under end of the part F, and is to be let in fluſh with the under end of the door, and faſtened thereto with a wood-ſcrew, as the part F is to the edge of it.

H, The Friction-roller, on which the weight of the door is ſupported: this Roller is one inch and three eighths diameter, and its extreme thickneſs half an inch.

F I G. 6.

A View of the bottom End of the under HINGE *and* FRICTION-ROLLER.

E, The Centre, on which the Hinge turns.

F, F, F, The under part of the Hinge, that is fixed to the edge of the door, with the ſegment-part, to which the Friction-roller is connected.

G, The iron Arm, that ſupports the weight of the door.

H, The Friction-roller.

I, An iron Rim, which carries the outer ſpindle of the Friction-roller H, it is faſtened againſt the bottom part of the Hinge F with two ſcrews.

F I G. 7.

Part of the GROUNDSEL, *with its inclined Plane, on which the* FRICTION-ROLLER *paſſes, to open or ſhut the Door.*

K, A Plate of Cock-metal, whoſe extreme thickneſs is ſeven eighths of an inch, in which is cut a circular inclined plane; at the bottom of it the Friction roller reſts when the door is ſhut; and when it is open it reſts in the hollow part L, at the top of the inclined plane.

L, A ſmall hollow Curve, at the top of the inclined plane, for the Friction-roller to drop into when the door is open: this Plate is let into the Door-ſill fluſh with its upper ſurface.

The Committee examined the Hinges, and the letter ſent therewith, and were of opinion that the invention was ingenious, and the Hinges better contrived than any in preſent uſe.

Reſolved to recommend to the Society to give the Silver Medal to the Inventor, he leaving the pattern produced with the Society, for the uſe of the Public.

This Reſolution was agreed to by the Society, *October* 27, 1773.

CHAP. XIII.

A Deſcription of Mr. HILL's APPARATUS *to prevent the ill Effects of Mercury in Water-gilding.*

A, THE Fire-place in the Wall, as in the common method.

B, Part of the Chimney, as in the common way.

C, An iron Funnel, or Trunk, one foot ſix inches long, one foot three inches broad, and four inches deep, having a joint, or return, the ſame breadth and depth, and one foot long at its upper end, which is fixed in an aperture in the chimney.

D, The under part of the Funnel, the bottom edges of which are two feet three inches by one foot ſix inches: the upper edges of it are the ſize of the under end of the Funnel C, to which it is rivetted.

E, A round iron Funnel or Pipe, fixed in the Funnel D, and its upper end to the draught-hole of the Bellows F.

F, A pair of common Bellows, with its pipe fixed in the chimney, its under board reſting on the upper end of the Funnel D.

G, A piece of Wood, one end of which is fixed in the chimney; at the other end is fixed a pulley.

H, A Line, one end of which is faſtened to the upper handle of the Bellows; the other end deſcending over the pulley, is faſtened to the Stirrup I.

I, The Stirrup, which being put on the foot, the Bellows is worked, which draws the fumes from the fire-place, and conveys them into the chimney.

The Committee of Chemiſtry had one of theſe Apparatuſes made, according to *Mr. Hill*'s principles, and fixed up at *Mr. Platz*'s, a Water-gilder, and made trial of it *March* 12, 1774. *Mr. Platz* gilded ſeveral pieces of watch-work, in the preſence of the Committee, with the Machine in the ſituation deſcribed, and alſo ſeveral pieces, the Machine being removed. *Mr. Platz*, being aſked, whether he had ever ſeen a Machine of this kind, and for this purpoſe? anſwered, he had not. Being aſked, whether he found in working any difference when the machinery, invented by *Mr. Hill*, was put up, or not? anſwered, he found a great difference when it was put up, particularly in not perceiving the ſweet ſmell from the fumes of the mercury, from which the workmen think the miſchief to them ariſes. Whether he is inclined to uſe this machinery as a means of preſerving his health in his work? anſwered, he ſhould always uſe it.

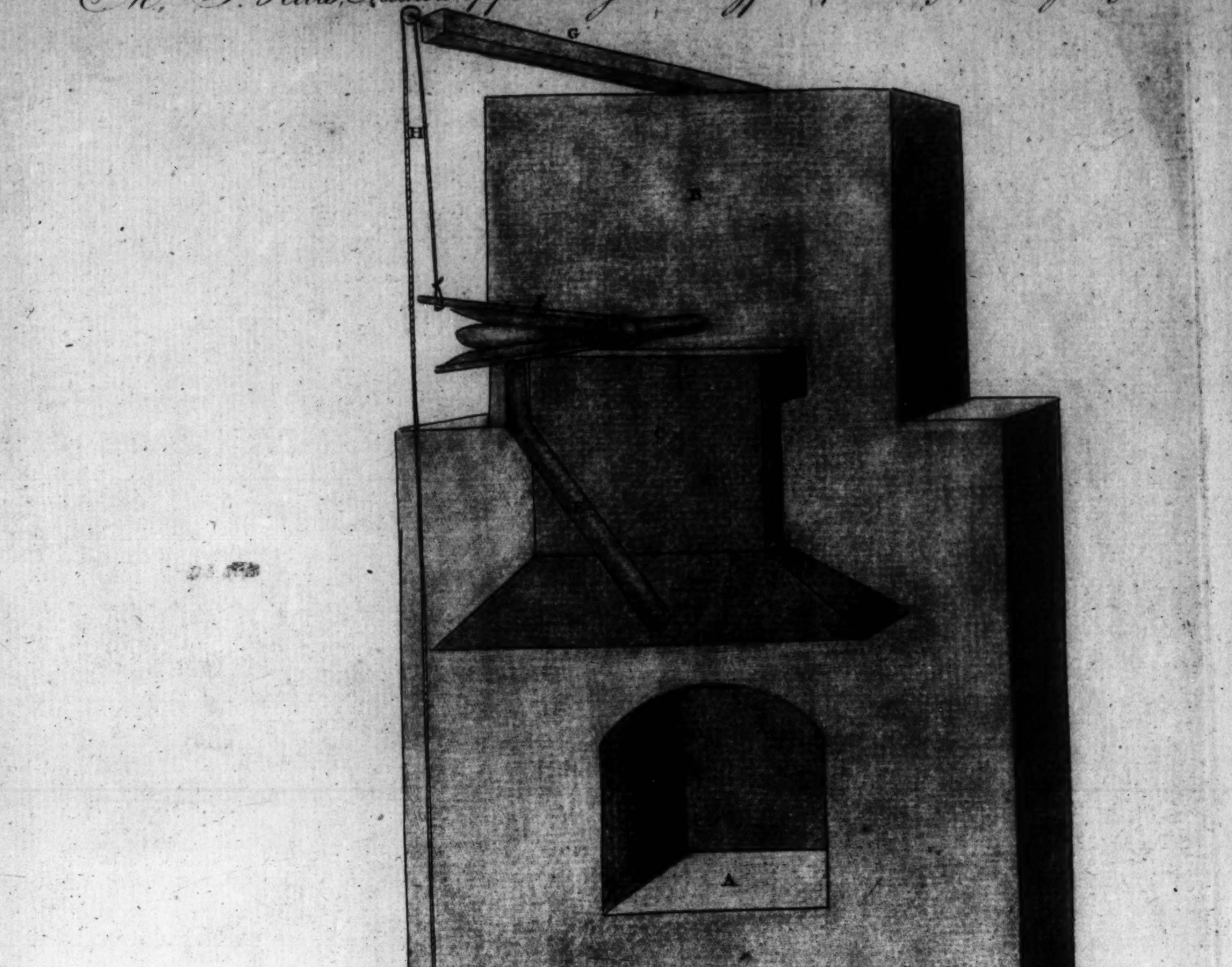
Reſolved, the air of the room, during the trials made by Mr. *Platz*, was ſenſibly better when the machinery was uſed, than when it was not.

Reſolved the contrivance and the Machine, being ſimple and cheap, are likely to prove of great utility to the workers in Water-gilding, particularly in the ſmall way.

Reſolved it is the opinion of the Committee, that the Candidate is intitled to Twenty Guineas, being the premium offered; to which the Society agreed, *April* 8, 1774.

CHAP.

Mr. J. Hills, Method of preventing the Ill Effects of Mercury in Water-gilding.



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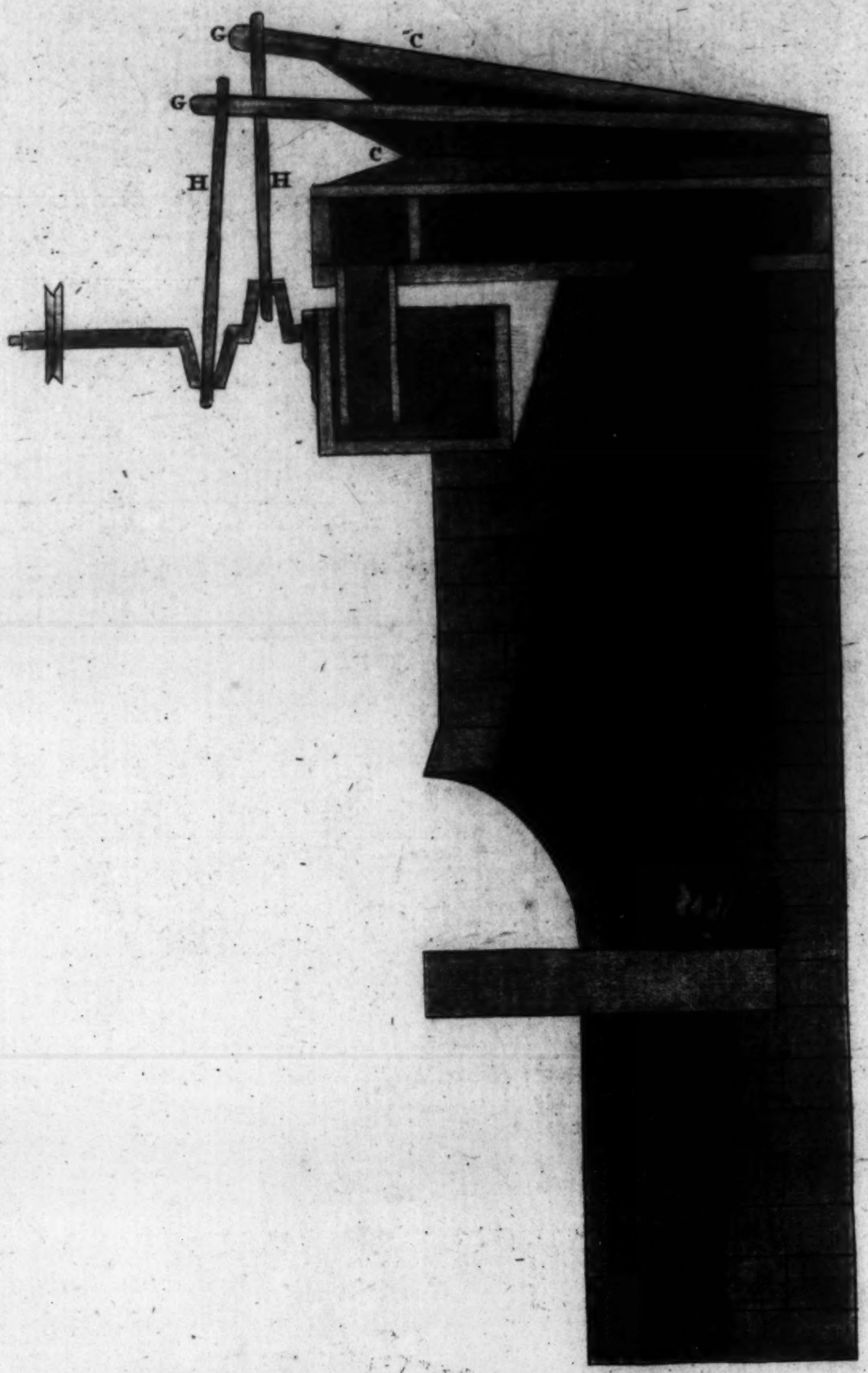
Alexr. Mabyn Bailey's Method of preserving the Effluvium of Mercury in Water-gilding.



C H A P. XIV.

An Improvement on MR. HILL'S *Method of preventing the ill Effects of Mercury in* WATER-GILDING, *by* ALEXANDER MABYN BAILEY; *whereby the Particles of the Mercury (which in the common Method of working are carried off in Effluvium) are retained and ſaved for uſe.*

A Section of the APPARATUS, *taken from one Side.*

A, THE Fire-place, with its chimney and arched flue, which conveys the ſmoke and effluvium into the Trunk B.

B, A Trunk, two feet two inches ſquare, and four inches and three fourths deep, inſide meaſure: this Trunk is fixed on the upper end of the chimney, to receive the ſmoke and effluvium.

C, C, Two pair of Bellows, each of which is two feet nine inches long, and one foot broad: theſe Bellows are fixed on the upper ſurface of the Trunk, and draw the ſmoke and effluvium from the Trunk, and convey it into the Cheſt D.

D, The Cheſt, into which the ſmoke and effluvium are conveyed by the Bellows: this Cheſt is two feet two inches long, five inches broad, and four inches and three fourths deep, having two pallets fixed againſt the under ſurface of the apertures of the Trunk, and is ſupported againſt them by two wire ſprings, to prevent the ſmoke, &c. from getting into the aſcending bellows.

E, A wooden Spout, eleven inches long, and three inches ſquare, inſide meaſure: this Trunk is fixed in the middle of the Cheſt, and conveys the ſmoke and effluvium to the bottom of the Water-trough F, which is kept three parts full of water, to condenſe the ſmoke and effluvium.

F, The Water-trough, two feet long, eleven inches broad, and nine inches deep, inſide meaſure.

G, The Handles of the Bellows, nine inches long, and one inch and a half diameter.

H, H, Two iron Rods, one foot ten inches long, by which the Bellows are lifted.

I, A double Crank, of three inches radius, one ſpindle of which turns in a Bracket, fixed in the middle of the fore ſide of the Water-trough: on the other end of the Crank-ſhaft, is fixed a Whar, ſix inches diameter, to receive the chain of a jack, by which the apparatus may be kept in motion.

This method of preſerving the effluvium was contrived in conſequence of ſeveral artificers in the branch of Water-gilding applying to ſee the model invented by *Mr. Hill*, who expreſſed the great advantage it would be to them, if the effluvium could be ſaved.

C H A P. XV.

A Deſcription of Mr. FRAZER's APPARATUS, *for fiſhing up Goods from the Bottom of the Sea.*

A, &c. SIX Hooks, or Callipers, whoſe under ends form a radius from the Centre-pin of one foot ſix inches: from the Centre-pin to their upper ends are two feet ſix inches long, their extreme breadth three inches and an inch thick.

B, B, The two iron Bolts, which paſs through the middle of the under part of the Calliper, are two feet long from the ſhoulder of their heads, and an inch diameter, with a feather-key at their outer end.

C, The Centre-bolt, or bin of the Calliper, two feet long, and two inches diameter; the middle is flat, two inches thick, and forms a portion of a circle of four inches diameter, with a hole through it, an inch and one fourth diameter, to receive the ſpindle of the Lifting-rod: at each end of this Bolt there is a collet and feathered Bolt.

D, D, Two Bolts, two feet long from the ſhoulder of their heads, and two inches diameter, with feathered bolts at their other ends: theſe Bolts form Centre-pins for the upper ends of the Callipers and the Lifting-arms.

E, E, E, E, The Lifting-arms, two feet ſix inches long from centre to centre, three inches broad, and an inch thick.

F, The upper Bolt, on which the upper ends of the Lifting-arms and the two iron Staples turn: this Bolt is the ſame ſhape and dimenſions as the Bolt C.

G, G, The iron Staples, by which the Apparatus and its contents are drawn up from the bottom of the ſea: theſe Staples are ſeven inches long from their under ends to their upper part, where the ropes bear in lifting up the goods; they are three inches broad, and an inch thick.

H, The iron Rod, by which the Apparatus is let down to the bottom of the ſea: this Rod is five feet long, and an inch and one fourth thick: it paſſes looſely through the hole in the middle of the Bolt E, and is fixed with a ſcrew and nut under the Bolt C; the upper end of it has a hole through it to faſten the Rope I to.

I, The Rope, by which the Apparatus is let down. Note, While the Apparatus is deſcending, the Rope K muſt be let ſlack, which admits the Calliper to be open, as is ſeen in Fig. 1. When it is at the bottom, the Rope I muſt be let ſlack, and the Contents drawn up by the Rope K.

K, The Rope, by which the Apparatus and its contents are drawn up out of the ſea. See Fig. 2.

This Model was examined by the Committee of Mechanics, who were of opinion that the invention is very ſimple in its conſtruction, and appears very likely to anſwer the purpoſe intended; therefore recommended to the Society to give *Mr. Frazer* a bounty of Ten Guineas, which was agreed to by the Society, *April* 23, 1776.

F I N I S.

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Mr. Frazer's Apparatus for fishing up Goods from the bottom of the Sea.

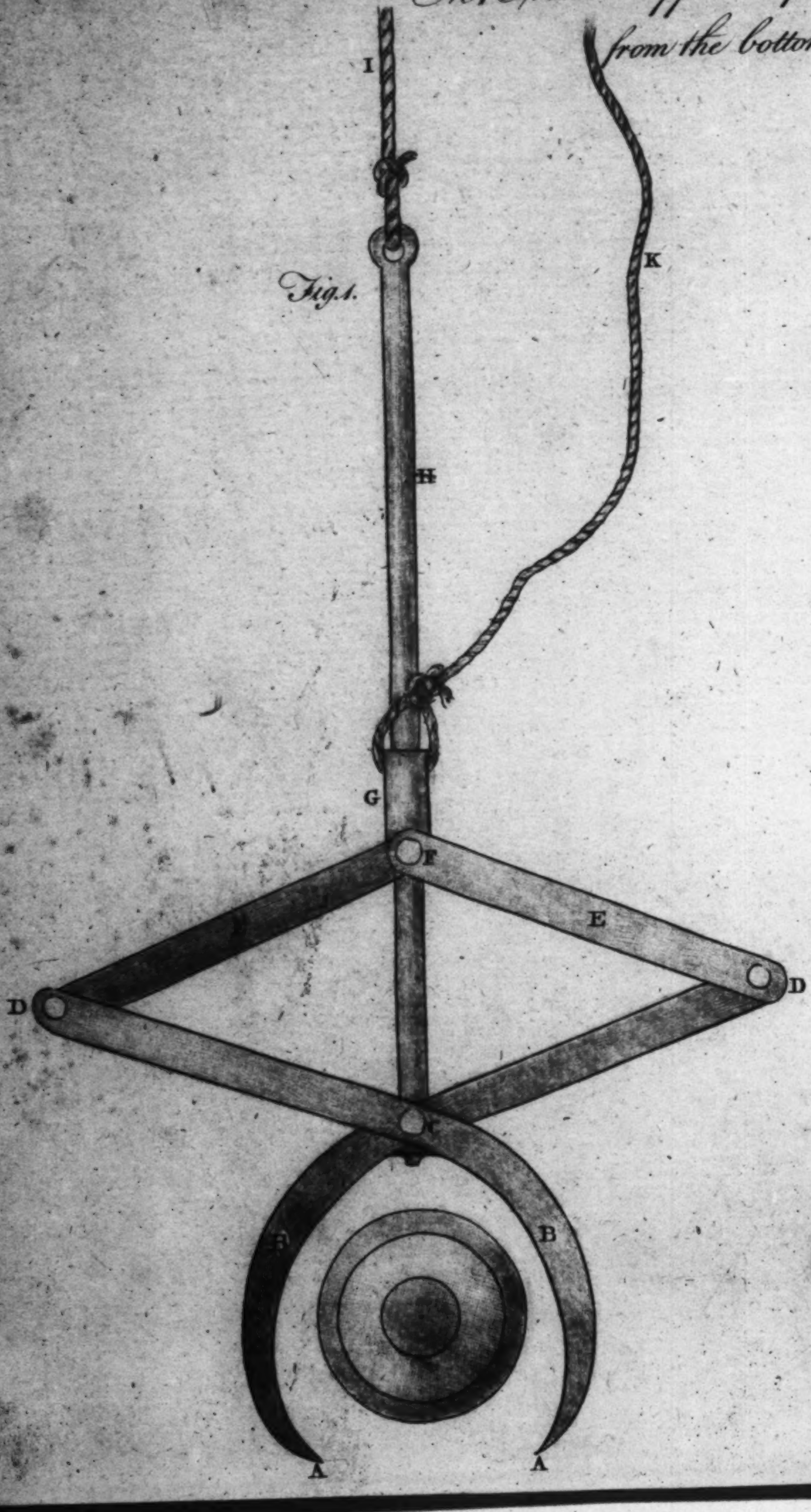

Fig. 1.

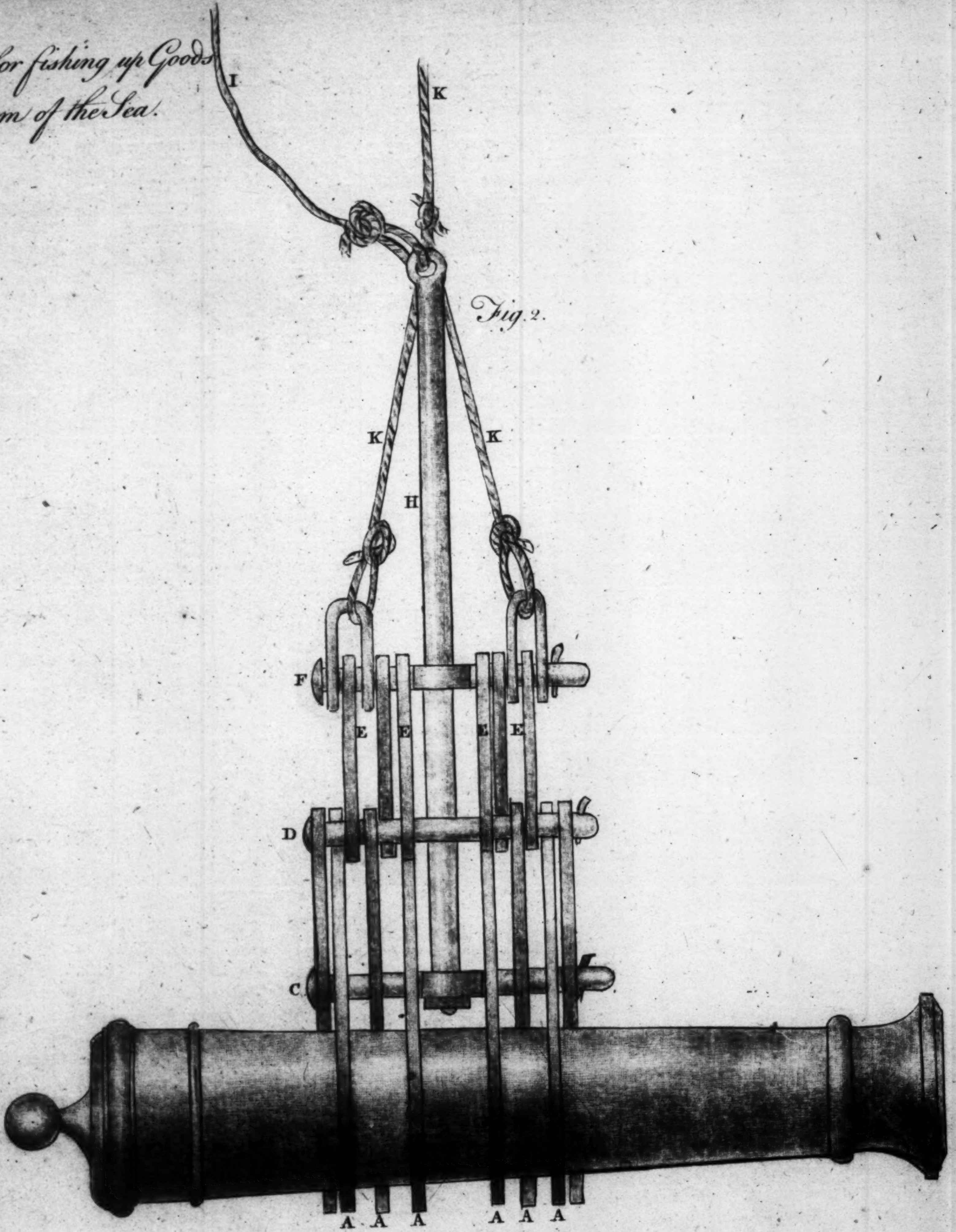

Fig. 2.

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